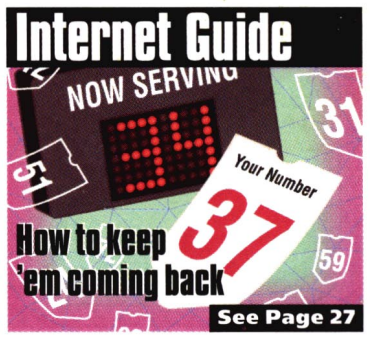
MacWEEK



04.01.96 *The Newsweekly for Macintosh Managers* VOLUME 10 NUMBER 13

Chip makers, clones speeding to 200 MHz

By Joanna Pearlstein

Breaking a historic speed barrier, both IBM Corp. and Motorola Inc. are prepping PowerPC 603e and 604e processors in the 200-MHz range that will show up in systems from Apple and Mac clone vendors this year.

Apple's first machines with the speedy 604e may arrive as early as this fall (see 03.18.96, Page 1). In 1997, the company will reportedly begin using 225- and 250-MHz 604e processors.

Ross Ely, Apple product line manager for Power Macs, said that this year, "200 MHz is certainly the goal. If the yield and volume allows it, we'll certainly ship it to customers," Ely added that Apple is now conservative with its estimates for fear of inventory backlog problems.

Power Computing Corp. may beat Apple to the 200-MHz punch.

See 200 MHz, Page 90

Big sites turn backs on Mac

Apple attempts to stem the tide

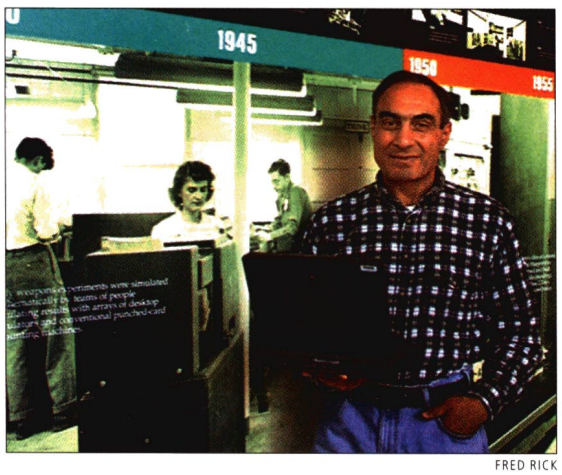
By Mark Hall

The 30,000 Mac users at Northern Telecom Ltd. got a rude awakening last month when the Global Enterprise Services division circulated a memo announcing its intention to dump their computers. Employees at other large organizations have also discovered that Macs have worn out their welcome with some IS managers.

The Nortel memo was issued under the direction of Bill Holtz, vice president of GES. It said that after a six-month evaluation, the Mississauga, Ontario, company had concluded, "We should transition from our current environment, which is largely Apple Macintosh, to a PC platform running Windows 95."

The transition will take three years to jettison the Apple machines installed throughout Nor-

See Big sites, Page 88



FRED RICK

The history of computing at Los Alamos National Labs dates back to the very first machines. Hassan Dayem, a Los Alamos computing director, has launched a study to see if the Mac has a future there.

NEWSPAPER SECOND CLASS

Apple faces huge loss; CEO says worst is over

By Mark Hall

Coming to grips with harsh market realities, Apple took what was seen as its first major step toward recovery last week. Chairman and CEO Gilbert Amelio announced that the company expects to lose an estimated $700 million in its second quarter, ended March 31. According to sources, up to 2,000 Apple jobs are at risk if financial pressures continue.

In a prepared statement, Amelio said that more than half of the quarter's loss will be from inventory write-downs and one-fourth of it will come from restructuring charges related to January's layoffs. The balance — about $175 million — will be a quarterly operating loss. The company said the tally of the latest quarter's revenues and unit shipments will be substantially less than last year's.

Despite the red ink and sketchy details, Wall Street ac-

See Loss, Page 88

Apple's losses through the ages
Q3 1985: -$17.2M
"It is clear that the new organization and management team will vastly improve Apple's profitability."
— John Sculley
Q3 1991: -$53.1M
"Our restructuring activities ... while difficult in the short run, will provide important competitive benefits as we move forward." — Sculley
Q3 1993: -$188.3M
"[We'll] eliminate the Executive Management Team and replace it with an Operations Committee of about 15 to 20 ... senior executives." — Michael Spindler
Q1 1996: -$69M
"Restoring the company to profitability will take time."
— Spindler
Q2 1996: -$700M*
"I'm confident at this point that I know what the problems are and that they are fixable."
— Gilbert Amelio

*Estimated. Source: Apple annual reports and press releases.

Eudora 3.0 will bulk up filters, nicknames, text

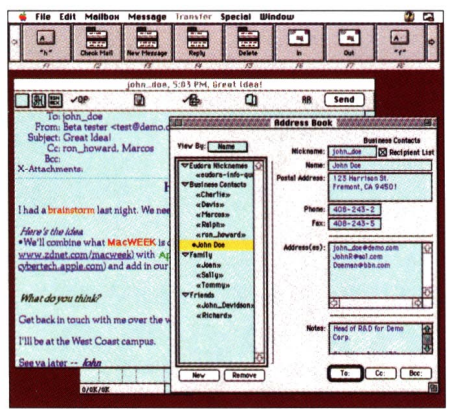
By James Staten

Qualcomm Inc. is reportedly prepping a new version of its $89 Internet mail client for release this month. According to sources, Eudora Pro 3.0 will provide more-powerful address books, mail filtering and search capabilities. Users will also be able to send and receive messages with styled text and embedded URLs.

The new address-book window will reportedly make it easier to maintain multiple sets of names and add physical addresses, telephone numbers and fax numbers to each listing. Users will be able to view all address-book files at once through a hierarchical list.

Drag-and-drop features will reportedly be implemented throughout the e-mail program, letting users drag text into an address-book listing, between messages or

See Eudora, Page 88



Eudora 3.0 may brighten up even the most drab messages through its handling of styled and formatted text plus live URLs.

Apple courts key developers at entry level

By Clifford Colby and Joanna Pearlstein

Rolling out the red carpet, Apple last week attempted to pacify developers concerned about reports it will abandon the home and education markets. Sources said the company told more than 100 developers at a meeting at its Cupertino, Calif., headquarters that it was in the low-end markets to stay.

According to attendees, key Apple executives spent the day courting developers by showing off forthcoming technologies and CPUs that the company said will help it create and sell its wares.

Heidi Roizen, new vice president of developer relations, told attendees her experience outside of Apple gave her insight into de-

See Entry level, Page 90

"A machine we love even more than the PowerMac 7500 - the PowerWave 604"

– MacWorld February 1996 MW ★★★★ MW EDITORS' CHOICE

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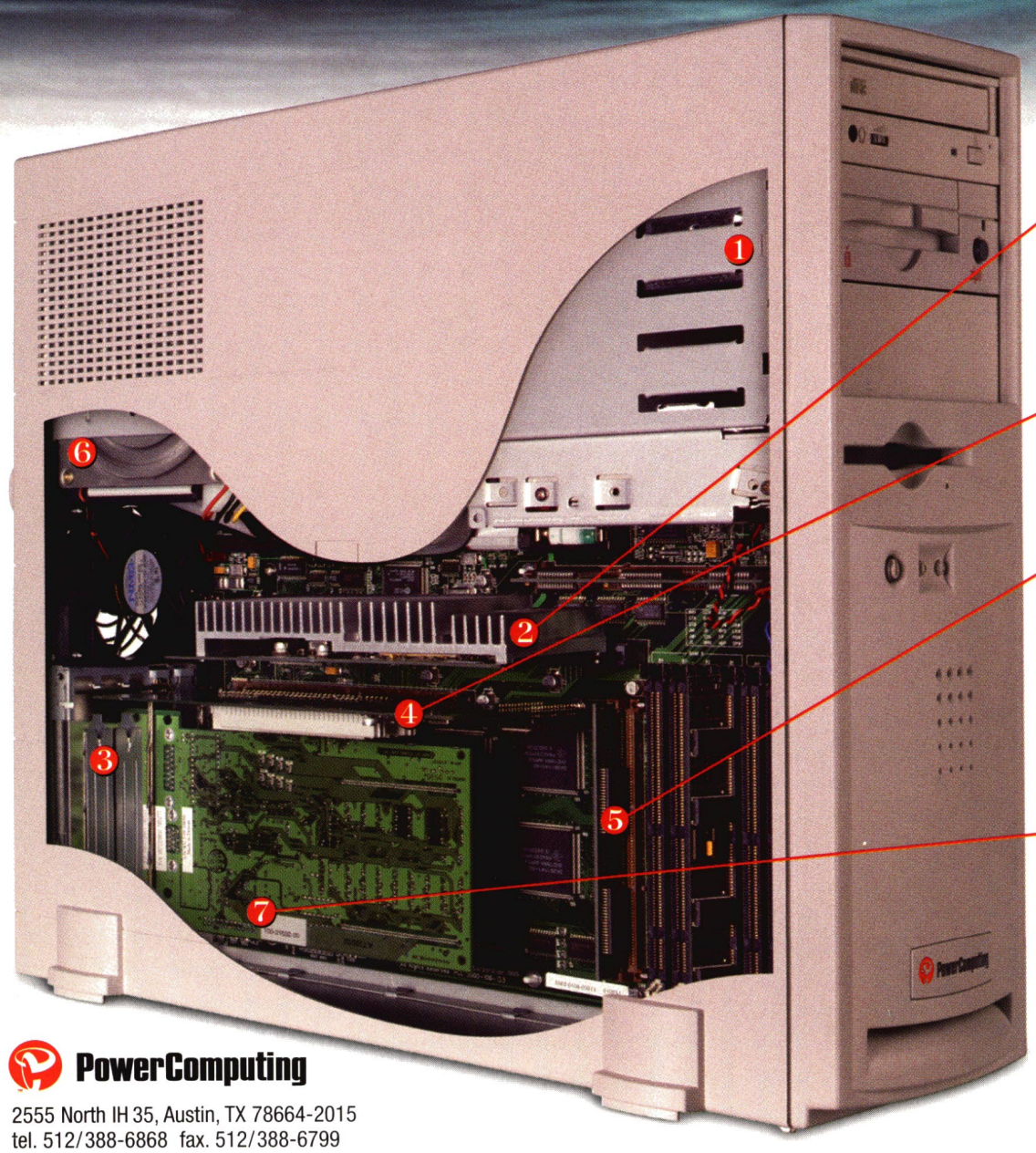

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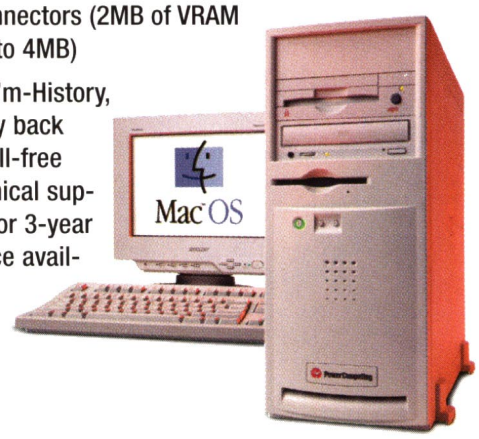

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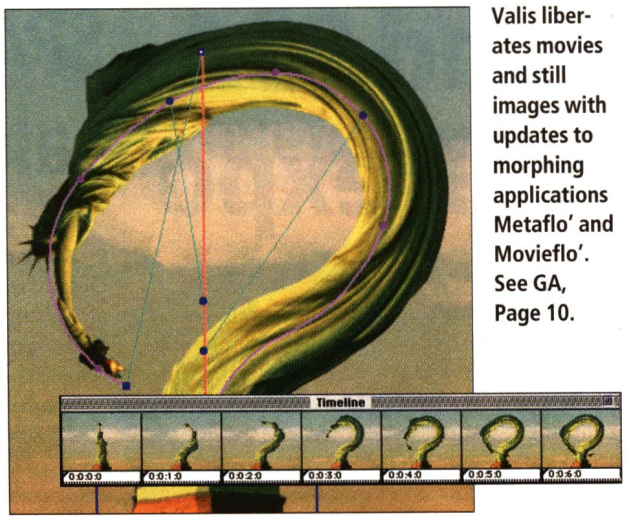
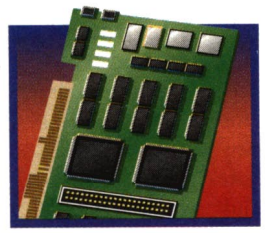
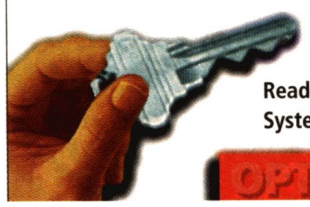


Valis liberates movies and still images with updates to morphing applications Metaflo' and Movieflo'. See GA, Page 10.



How do two Intel-standard PCI card vendors fare in the Mac market? See Reviews, Page 41.



Readers unlock the secret that allows System 7.5 installations from any Mac. See MacInTouch, Page 53.

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MACWEEK INSIDER RICK LEPAGE

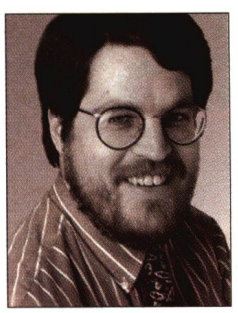
Amelio's New Deal

After 52 days in office, Gilbert Amelio finally shut down the banks.

It's not his pronouncements last week of an anticipated $700 million quarterly loss that ties it in my mind to Franklin Roosevelt's actions 60 years ago. No, it's the fact that the Apple chairman did *something*, even if it was largely to announce bad news.

Roosevelt's 1933 "bank holiday" closed every bank in the United States in an attempt to stop the epidemic of bank failures across the country. Amelio's action is the first honest step in stanching the hemorrhaging of the Mac platform.

The first time I heard Amelio speak, he had been on the job for 12 days. Being the new guy, his presentation to the press that day was light on substance. The one point he made that stuck with me was that we — the press, Wall Street and Apple customers — had to give him 100 days to fix the problems at Apple. Roosevelt didn't ask for 100 days: He just rolled up his sleeves and did everything he could to ram home his agenda.



Since that day, I've been waiting for Amelio to show some sign that he's got that same spark inside. His first public performance, at Seybold Seminars Boston 96 last month, was a disappointment to me and many others who were in the audience.

I understand that for competitive reasons alone we can't expect every action of Apple's to be out in the open, but the silence out of Cupertino, Calif., has been deafening. So, for the past few weeks I've been singing those "we're dealing with the same old Apple" blues.

I stopped singing that tune Wednesday. Seven hundred million dollars. That's more than 10 times the amount Apple lost last quarter. And with the news that more corporations are leaving the Mac than adopting it, the outlook isn't getting better.

So why don't I just start looking for work over on the Wintel side of the road? Because of Amelio and his little fireside chat on the Apple Web site (http://product.info.apple.com/pr/library/1996/march.html). He's doing something. It's not pretty, but it's necessary. And, unlike previous bad news from Apple, this message was controversial. It was dangerous.

According to Amelio's statement, more than half of the projected loss will come from inventory write-downs, and a quarter of it will be in restructuring charges related to layoffs. I guess the rest is just your everyday pure loss and the ex-CEO's parachute. C'est la vie.

Amelio wants to create a new Apple, and he needs to tear the old one down.

My favorite part of the letter, however, was the most un-Apple statement I've ever seen: "The matters discussed in this news release are forward-looking statements that involve risks and uncertainties [which] include without limitation the effect of adverse publicity (including this announcement) on demand for the company's products; the effect of continued losses on the company's liquidity; continued competitive pressures in the marketplace; the effect on inventory valuations of decreased demand and lowered prices; and the effect of any business restructuring actions."

Yeah, those are the lawyers speaking, but this isn't the action of a milquetoast. They know they're in uncharted waters. They know that there are leaks in the boat. They also know that things are going to get worse before they get better.

Does Apple *have* to take such a huge hit on inventory? Right now, only Apple and the Securities and Exchange Commission know, but I'm sure the company had options. It's obvious that Amelio wants to create a new Apple, and he needs to tear the old one down to bedrock.

Ultimately, Roosevelt closing the banks wasn't what steered the country out of the Depression (what did is a whole other metaphor), but it got the country thinking about the problem in a different way. Amelio's message last week ultimately won't save Apple. At least he's letting us know who's in charge. □

Where does Apple go from here? Is it on the right track? Send your mail to Rick LePage, MacWEEK editor, at rick_lepage@macweek.com.

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Fibre Channel and SSA speed up for NAB expo

Sneak previews from Transoft and PathLight

By David Morgenstern

High-speed storage for Macintosh digital video will shift into overdrive at the National Association of Broadcasters conference and expo in Las Vegas this month.

Several vendors are expected to unveil PCI cards and drives based on next-generation SCSI-3 interfaces: Serial Storage Architecture (SSA) and Fibre Channel Arbitrated Loop (FC-AL), which offer potential data transfer speeds of 70 and 200 Mbytes per second.

Transoft Corp. of Santa Barbara, Calif., will give Mac users a peek at its FibreNet line of FC-AL cards and arrays. FibreNet will let users connect to shared volumes on a 36-Gbyte hardware-controlled RAID Level 3 array. Incorporating up to nine 4-Gbyte Seagate FC-AL drives, the array will provide a sustained data transfer rate of 55 Mbytes per second, Transoft said.

The company claimed its Mac products, slated for release in May, will be the first FC-AL devices for any desktop platform. Versions for Silicon Graphics Inc. and Sun Microsystems Inc. platforms and systems running Windows NT will follow later this year.

Transoft's FC-AL network will run over twisted-pair cable lengths of up to 65 feet and will hold a combination of up to 126 devices, including single drives, arrays and workstations. The company said it expects to implement TCP/IP over FC-AL by the end of the year. The company will also offer a rackmount, 10-port FC-AL hub for sites with more than three users.

Although pricing has not been set, Transoft said it expected a cost per node of $4,000 to $10,000, depending on the number of users.

Attendees at the NAB show can check out a wide range of new SSA products, including software RAID for the Mac OS and new SSA CD-ROM drives.

Pathlight Technology Inc. of Ithaca, N.Y., will show Macs running its StreamLine-PCI and High Speed SSA Data Pump PCI cards, which cost about $900 (see 12.11.95, Page 6). The systems will use a still-unpriced SSA version of CharisMac Engineering Inc.'s Anubis RAID software driver. The systems will also be demonstrated on a Scitex America Corp. Mac-based ImMIX video workstation.

With the cards and software, users will be able to create striped arrays by adding SSA hard drives, now available from IBM Corp. According to Pathlight, the arrays provide sustained data transfer rates of 37 Mbytes per second reading and 34 Mbytes per second writing. Pathlight said the cards and drivers support direct memory access transfers; TCP/IP is expected by the end of summer. An SSA network will run over twisted-pair cable lengths similar to FC-AL, the company said.

Microtech International Inc. of East Haven, Conn., will take the wraps off a new line of SSA storage products, code-named CrossRoads. Slated for release in June, the lineup will include a PCI card, RAID software and drive bundles. The card will cost about $1,000; the drives will sport prices comparable to current Ultra SCSI models, Microtech said.

In addition, the Pathlight booth will show upcoming CD-ROM drives with SSA interfaces from Mitsumi Electronics Corp. of Irving, Texas. □

Aladdin uncorks sequel to compression utility

StuffIt Deluxe 4.0 improves on Finder integration

By Clifford Colby

Aladdin Systems Inc. this month plans to polish up its StuffIt Deluxe compression utility. The upgrade to Version 4.0 will include better integration with the Finder as well as enhanced e-mail and Internet capabilities.

Version 4.0 will let users create, examine and modify StuffIt archives in the Finder through the StuffIt Browser extension. By double-clicking on an archive, users will be able to see its contents without launching the full StuffIt application. To decompress a file in an archive, users will drag the file from an open browser window onto the desktop. A file can be stuffed into a StuffIt archive by dragging it into an open browser window.

Aladdin said the upgrade will also execute several tasks faster. Version 4.0 will compress files 20 percent faster than before and expand files up to 50 percent faster, the company said.

Aladdin said it plans to add capabilities to StuffIt's Magic Menu Finder menu. The update will work with additional Internet archiving and encoding file formats, including segmented and multipart uuencoded and BinHex files and Unix tar files.

StuffIt Deluxe 4.0 will let users of Qualcomm Inc.'s Eudora compress and mail a file or folder from the Finder. Users will be able to select an item in the Finder, then choose Stuff and Mail from Magic Menu to stuff a file and attach it to a new e-mail message.

StuffIt's SpaceSaver component will now attach a visual tag to file icons that have been compressed with SpaceSaver.

Version 4.0 will cost $129, but registered users will be able to upgrade for $29 through July 1.

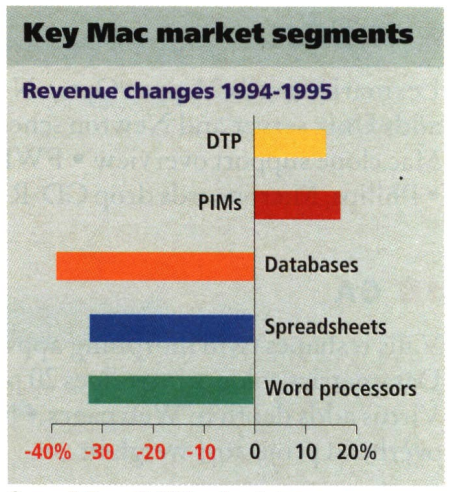
Aladdin Systems Inc. of Watsonville, Calif., can be reached at (408) 761-6200 or (800) 732-8881; fax (408) 761-6206; info@aladdinsys.com. □

SPA survey: Mac app sales dropped in '95

By Mark Hall

Despite record shipments of 4.7 million Macs in 1995, Apple's software developers lost ground.

According to a survey of U.S. and Canadian personal computer software sales conducted by the Software Publishers Association of Washington, D.C., the Mac portion tumbled to $1.05 billion from $1.23 billion the previous year, a 14.3 percent decline. Total software sales grew 12.3 percent, to $7.53 billion in 1995, up from $6.7 billion in 1994.



Source: Software Publishers Association.

Mac application sales took 14.5 percent of the market, down from 18 percent in 1994, while Windows software dominated with 75 percent of overall sales. DOS software accounted for only 9.5 percent of annual revenue.

"The concern for Mac developers is: How big is the market?" said SPA Research Director Jim Sanders. According to Heidi Roizen, Apple vice president of developer relations: "Mac software sales were $1 billion last year. That's not a dead market."

The SPA said Mac spreadsheets and word processing applications declined the most each dropping 32 percent from 1994 to 1995.

"Our entire Mac business is down in line with the industry," said Dave Meltzer, Mac product manager for Microsoft Corp. of Redmond, Wash. "But the fundamental business strength measured in volume continues to be strong."

Claris Corp., on the other hand, declared a record calendar year in sales for its products, $183.8 million in 1995 over $157.3 in 1994.

"We've seen some contraction, but we're not sure whether it's the overall industry, Mac-specific, or anticipation of upcoming releases of QuickMail and QuicKeys," said CEO Ford Goodman of CE Software Inc. of West Des Moines, Iowa.

But Larry Zulch, president of Dantz Development Corp. of Orinda, Calif., said: "Our sales have been strong. Other than a short drop during [December and January], we've been quite pleased with how sales have been going."

Critics have said the SPA's study reflects excessive channel sell-in of Windows 95 applications, not actual sales to customers. □

IT WAS 20 YEARS AGO TODAY ...

Apple won't take time out this week to celebrate its 20th birthday; it's delaying the official party until the presumably more pleasant business climate of January 1997.

The spunky company born in a garage ended up a quite different creature from its sober-minded role model, Hewlett-Packard Co. Apple quickly grew into a media darling and a high-flying initial public offering that made instant and almost scandalous fortunes. The Cupertino, Calif., company that was founded on April Fool's Day 1976 obviously had a sense of humor, a corporate character trait that could be useful to its current employees and customers.

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Lexmark to ship peppy printer

By David Morgenstern

Lexmark International Inc. in May will release its Optra N Model 245, a new high-speed laser printer aimed at workgroups.

Based on a tabloid-size 600-dpi Canon engine, the Optra N will support print speeds of 24 and 13 pages per minute with letter- and tabloid-size pages, respectively. Shipping with 16 Mbytes of RAM, the printer will have a street price of about $3,800, the company said.

Lexmark's Optra N laser printer can take a 2,000-sheet feeder.

The Optra N will use a 50-MHz Intel i960 processor for proprietary PostScript Level 2 and PCL 5E emulations; it will employ a common rasterizer for both languages. According to Lexmark, the printer's optimized design will process PostScript up to 70 percent faster than Hewlett-Packard Co.'s $4,899 LaserJet 5si MX for heterogeneous networks.

The processor will also incorporate halftoning algorithms and a new image-enhancement technology that can output images with an interpolated resolution of 600 by 2,400 dpi, Lexmark said.

The printer will come with 39 Type 1 and 75 PCL fonts. It will be able to use up to 64 Mbytes of RAM and will come with a 100-Mbyte hard drive for fonts and print buffering.

In addition to a 100-sheet legal-size tray, the Optra N will come with a pair of 500-sheet tabloid-size trays. Users will be able to add a 2,000-sheet tabloid-size feeder; in the second half of the year, Lexmark will offer a three-bin finishing unit with an integrated stapler.

The printer will ship with parallel, serial and multiprotocol Ethernet interfaces. The stripped-down Model 240, with 4 Mbytes of RAM, will cost about $2,800.

The Optra N will ship with a new version of Lexmark's cross-platform MarkVision printer-management software. The update will let managers check paper levels in some Optra models as well as report printer errors.

In other news, Lexmark lowered the prices of its 1,200-dpi Optra Lx+ and Optra Lxi+ printers by $300; the new list prices are $2,399 and $3,249, respectively.

Lexmark International Inc. of Lexington, Ky., can be reached at (606) 232-2000 or (800) 891-0331; fax-back (606) 232-2380; http://www.lexmark.com. □

Meeting Maker XP updates over LAN

By David Morgenstern

ON Technology Corp. this week will update its cross-platform scheduling software at Networld+Interop in Las Vegas.

Version 3.5 of Meeting Maker XP is easier to manage, ON said; the new server software can update clients to new versions automatically over the network. Managers can also offload common administrative tasks to workgroups as well as create hierarchical directories of users based on location or organization.

In addition, users can now tag a meeting as private, limiting access to various groups in a site. ON said the update features a speedier searching routine, and beefs up Mac and Internet e-mail capabilities via support for SMTP (Simple Mail Transfer Protocol).

ON will also add large and small platforms for Meeting Maker XP. Its new bi-directional Newton 2.0 client lets users upload and download meeting plans; the five-user Newton pack costs $495.

The company also released $1,949 Unix server software, which ON said offers about 10 times the performance of its current OS/2, Windows and Mac servers.

Meeting Maker XP clients cost from $89 to $139 each; ON said the upgrades start at $19 per user, depending on license. The Unix server software upgrade costs $949, plus $39 per user.

ON Technology Corp. of Cambridge, Mass., can be reached at (617) 374-1400 or (800) 767-6683; fax (617) 374-1433; info@on.com or http://www.on.com/. □

INTEGRATE MACINTOSHES – with – Sun/SGI/HP

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Server to the Macs...

NEWS ANALYSIS

Support hot topic for clone users

By Joanna Pearlstein

Long accustomed to receiving a high level of customer service and technical support from Apple, Mac users with great expectations may go unfulfilled with clone vendors.

Power Computing Corp. of Round Rock, Texas, this year was hard hit by operational troubles and technical problems with some models. Users phoning the company endured long hold times, and Power admitted losing records of orders and calls (see 03.25.96, Page 1). Some owners of Power machines said they are wary of buying from the company again.

"Apple service and support is continually viewed as very high quality, so I think anything other than that might seem pretty alarming to a Mac user," said Eric Rocco, senior analyst at Dataquest Inc. of Westboro, Mass.

Service issues have also dogged financially troubled Radius Inc. of Sunnyvale, Calif. While the company this year sold its Mac license to UMAX Data Systems Inc., Radius continues to support System 100 and 81/110 users, who report minor bugs as well as delays in reaching customer service.

But what has irked Radius customers is the delay receiving rebate checks promised to customers at the time of purchase. While his rebate took three months to arrive, Kitt Diebold, a pre-press specialist in West Henrietta, N.Y., said he was "really pleased" with Radius' customer support.

Analysts said the support and service problems common to Mac clone vendors are par for the course in the Intel-standard PC industry.

"Mature clone manufacturers are pretty much stable in terms of their service infrastructure," analyst Rocco said. "There's a real incentive to make sure customer service is paramount. I'm not saying you won't be on hold for an hour and a half, but major problems [rarely] happen."

Analysts said PC users expect a lower level of service than their Mac counterparts, the din of PC-user complaints is constant on the Internet and on-line services. The targets included Compaq Computer Corp., Dell Computer Corp., Gateway 2000 Inc. and Packard Bell Electronics Inc.

Compaq users in January complained when the company started charging $35 an hour for technical support related to third-party software, including Microsoft Windows. The company said it will support only its hardware and software utilities.

Other vendors charge upfront for service of their products. Dell sells a support contract for users needing assistance with the company's software.

However, in the Mac market no clone vendor currently charges for helping users with software problems. □

UMAX forms subsidiary

By Matthew Rothenberg

Mac clone maker and scanner manufacturer UMAX Data Systems Inc. last week spun out its software efforts into a new U.S. subsidiary.

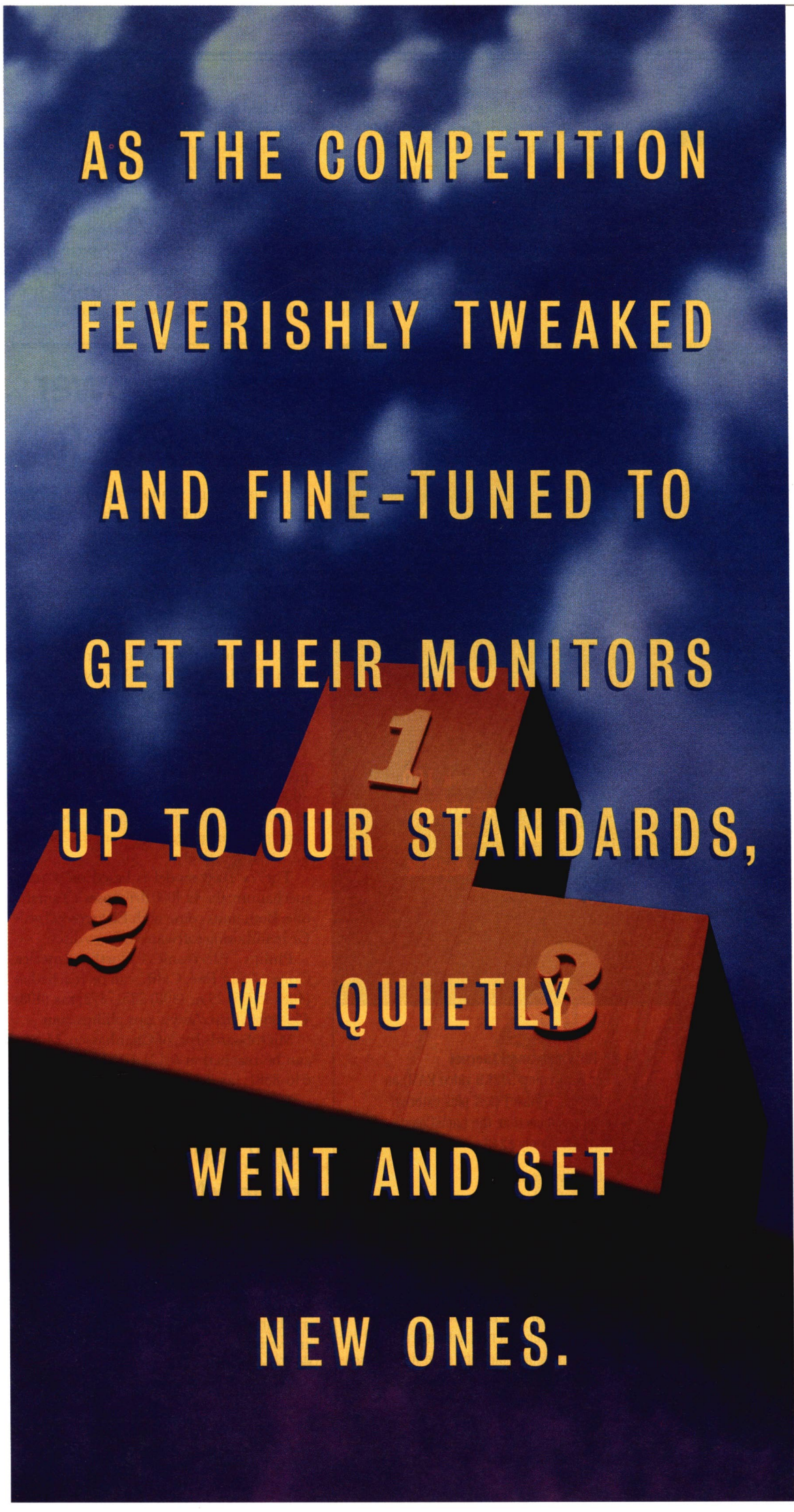
NewSoft Inc., based in Fremont, Calif., will develop and market software for retail sales in the United States and Europe, UMAX said.

The company's first product is ViewOffice PowerSuite, a $99 Windows suite that includes OCR, image-editing, fax, business scanning and forms software.

NewSoft said it is working on a Mac version of the suite, which will be based on PageManager software used in UMAX's PageOffice scanning package (see 11.27.95, Page 6). Slated for a summer release, the Mac version will not match the Windows suite feature for feature.

In addition, NewSoft will offer Wordlinx, OCR software from UMAX subsidiary Maxsoft-Ocron Inc. of Taipei, Taiwan.

According to NewSoft, the new company has no specific plans to bundle its software with UMAX's line of Mac clones, which the company recently acquired from Radius Inc. (see 01.15.96, Page 1). □



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Key #27408.

FWB rings out with Jaz

By David Morgenstern

Spinning a new tune for removable storage, FWB Inc. this month will release new drives and arrays based on Iomega Corp.'s Jaz mechanism.

With an expected street price of $599, the hammerJaz Solo 1000 uses Jaz 1-Gbyte hard drive cartridges. The drive has an average seek time of 12 milliseconds and a sustained data transfer rate of 3.49 Mbytes per second, FWB said.

A model bundled with FWB's $419 PCI JackHammer Fast and Wide SCSI-2 card will cost $899. The company said it will offer a sustained data transfer rate of 5.09 Mbytes per second. Both Solo models are expected to ship next week.

Slated for release later this month, FWB's hammerJaz arrays will come bundled with the JackHammer PCI card, the company's HSM ToolKit file-migration software and a striping-only version of the company's RAID ToolKit software.

The $1,799 2-Gbyte hammerJaz Duo 2000PCI array will use two drives and offer a sustained data transfer rate of 7.8 Mbytes per second. Users adding a second JackHammer PCI can achieve a sustained data transfer rate of 9.4 Mbytes per second, FWB said.

According to the company, users can build arrays with four or eight drives that provide sustained data transfer rates of 14.86 and 14.1 Mbytes per second, respectively.

FWB Inc. of Menlo Park, Calif., can be reached at (415) 325-4392; fax (415) 833-4657; info@fwb.com; http://www.fwb.com. □

Have A New PowerPC PowerBook?
Fill In The Blanks.

"Apple cut...on-board Ethernet found on the 500 series."
Stephen Howard - MacWEEK

"They (Apple) don't have built-in Ethernet."
Don Crabb - MacWEEK

"The PowerBook 190 ships with no video-out support..."
Henry Norr - MacWEEK

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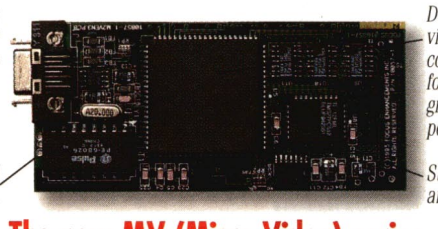
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Vendors lower costs of CD-R

A pair of storage vendors recently lowered the prices of their CD-Recordable packages.

▶ **Philips Electronics North America Corp.** in March trimmed the price of its CDD2000 CD-R drive from $1,395 to $1,035. The drive records at double speed and reads discs at quadruple speed.

In addition, the company switched vendors for the authoring software bundled with the drive. It now ships with Corel Corp.'s CD Creator 2.0 instead of CeQuadrat GmbH's Vulkan program. The drive also comes with two discs.

▶ **Microboards Inc.** also unveiled new prices for its CD-R system. Its PlayWrite 2000 and PlayWrite 4000 systems are now $1,195 and $1,995, respectively; the products' previous price tags were $2,250 and $2,500, respectively.

The 2x 2000 model is based on a Sony mechanism; the 4x 4000 drive uses a Yamaha one. Both units come with Elektroson Inc.'s Gear authoring software and two discs.

Philips Electronics North America Corp. of San Jose, Calif., can be reached at (408) 453-5129 or (800) 235-7373; fax (408) 453-0680; http://www.pps.philips.com.

Microboards Inc. of Chanhassen, Minn., can be reached at (612) 470-1848 or (800) 646-8881; fax (612) 470-1805. □

Sony beefs up capacity for new MO jukeboxes

With the addition of 2.6-Gbyte drives, Sony Electronics Inc. recently bumped up capacities for its magneto-optical jukeboxes.

Based on the company's SMO-F541 mechanism, the new jukeboxes can read and write 2.6- and 1.3-Gbyte MO cartridges; they can also read 650-Mbyte media.

Sony said the cartridge-transport systems in the changers offer a mean swaps between failure rating of 1 million cycles.

The $7,995 OSL-2001 uses one drive and can hold up to 52 Gbytes on 20 cartridges. A model with two drives is priced at $10,995.

The $17,995 OSL-6000 integrates a pair of drives and can handle up to 60 cartridges; it has a maximum capacity of 156 Gbytes. A four-drive configuration costs $23,195.

Sony Electronics Inc. of San Jose, Calif., is at (408) 432-0190 or (800) 352-7669; http://www.sel.sony.com/SEL/ccpg/. □

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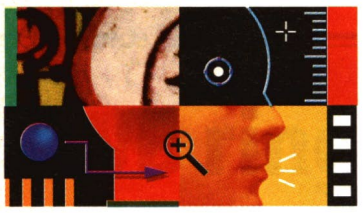


GA

DEALING PCI CARDS

PCI-based QuickDraw accelerators face off in this week's Reviews section. See Page 41.

Valis revs morphing apps

Metaflo' and Movieflo' turn 2

By Kelly Ryer

Metaflo' and Movieflo', the Valis Group's twin morphing programs for still images and movies, are about to reach Version 2.0. Both programs are slated to ship this month at the National Association of Broadcasters conference in Las Vegas.

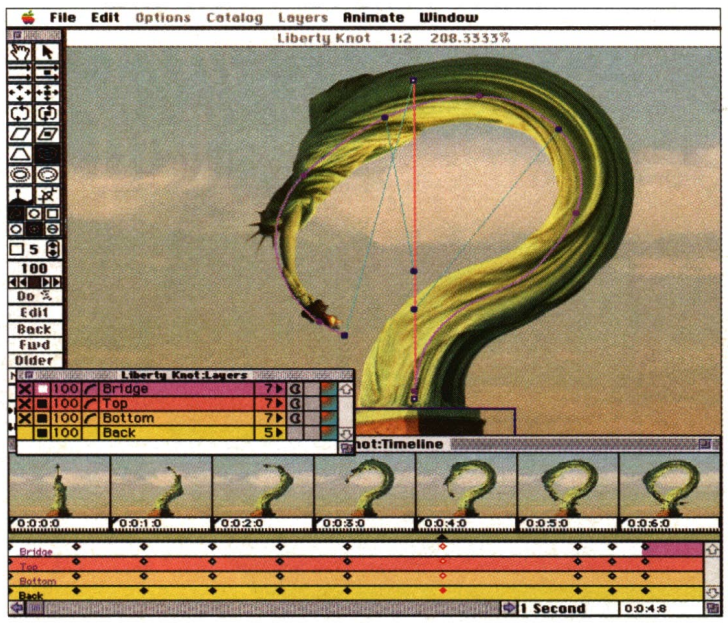
The $499 Metaflo' 2.0 will feature a host of improvements, including unlimited hierarchical undo and redo, alpha channel support, subpixel sampling, an unlimited number of keyframes, and a distortion engine based on fluid mechanics. New curve controls will let users define specific regions with editable curves before warping them, and a new Universal Reshape Tool will reshape one region based on the characteristics of another during a morph.

Metaflo' 2.0 will include a new layers palette and will let users create outline masks with variable opacity levels. The software will import and export still images in TIFF and PICT formats with or without alpha channels. Users will be able to export morphing animation as QuickTime movies, PICS files or sequences of numbered PICT documents.

The $699 Movieflo' 2.0 will offer the image-manipulation features of Metaflo' 2.0; in addition, it will let users import and edit QuickTime files as well as sequential PICTs or TIFFs.

"It gives you nicer, smoother bending, warping and morphing," said Chris Mooney, photographer and partner at Balfour Walker Photography Inc. of Tucson, Ariz. Mooney, who is beta testing Metaflo' 2.0, said he used earlier versions to create posters. "[Adobe] Photoshop doesn't interpolate bends well," he said. "Metaflo' can distort

See Valis, Page 12



Freedom of movement: Valis Group's Movieflo' warps a movie of the Statue of Liberty in several different layers simultaneously.

Datametrics printer speeds color output

By Matthew Rothenberg

Datametrics Corp. in March picked up the pace of 24-bit-color with a 20-page-per-minute printer based on new technology.

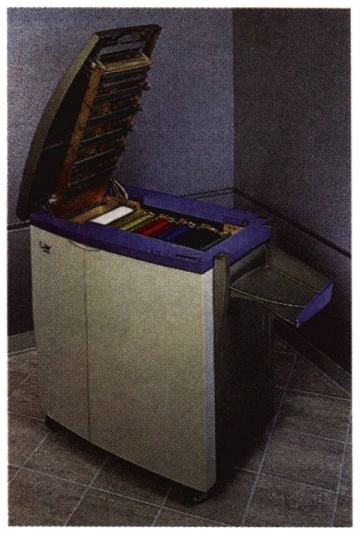
The CYMax 3240, which starts at $39,900, is built on a proprietary engine that combines four CMYK thermal heads to generate full-color output in a single pass.

According to Datametrics, the printer generates images that are UV-resistant and more durable than ink-based output. Since consumables are limited to the four thermal-ribbon cartridges, the CYMax 3240 is simpler to service than most color laser printers, the company said. Each cartridge has a capacity of up to 1,500 pages.

The CYMax 3240 offers a resolution of 300 by 300 dpi and outputs 3 inches per second. It prints to roll-fed paper measuring up to 12 inches wide, so users can print letter-, tabloid- or banner-size pages. Output costs about 34 cents per letter-size page, the company said. According to Datametrics, the CYMax 3240 can output 200,000 pages between service calls.

The printer runs Adobe PostScript Level 2 and includes 35 Type 1 fonts. It uses a 25-MHz AMD 29030 RISC processor and ships with 16 Mbytes of RAM, which can be expanded to 64 Mbytes via industry-

See CYMax, Page 12



Datametrics' CYMax 3240 folds four CMYK thermal-transfer heads into a single-pass, 20-ppm proprietary engine.

Symbolic Sound upgrades Kyma system with modules

By Kelly Ryer

Symbolic Sound Corp. recently gave professional audio tweakers a powerful tuneup to Kyma Sound Design Workstation, the company's system for creating and processing sounds.

Like earlier versions, Kyma 4.1 includes the software and a programming language as well as the Capybara, a black box containing four 33-MHz Motorola 56001 digital signal processors (DSPs). The Capybara attaches to a Mac via a NuBus card and cables, both of which are included with the basic $4,995 package.

Users can add up to four DSP cards for $595 each. A $395 upgrade lets the Capybara connect to equipment using the AES/EBU (Audio Engineering Society/European Broadcast Union) or S/PDIF (Sony/Phillips Digital Interchange Format) standard.

Symbolic Sound said the Kyma system creates unusual sounds that are well-suited to electronic compositions and special effects.

"We take sound effects and run them through its processing," said Frank Serafine, a composer and sound designer at Serafine Studios of Venice Beach, Calif. Serafine, who has been beta testing Version 4.1, used the Kyma workstation to process audio for Paramount Pictures' movie "Virtuosity," released in August.

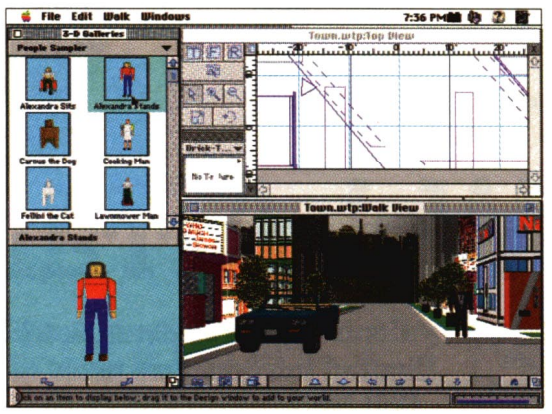
See Kyma, Page 12

Virtus widens scope of Web pages with VRML

By James Staten

Web designers can now add dimension to their pages, thanks to a new version of Virtus Corp.'s Virtus VR, due this week.

3-D Website Builder, priced at $99, is a Virtual Reality Modeling Language (VRML) implementation of Virtus VR, the company's 3-D space-building application. The new version can export VRML 1.0 files containing shading information, in-line objects, textures, levels of detail and Web anchors. Users can also export files with pointers to textures that download separately; this option generates smaller VRML files.



Virtus' 3-D Website Builder lets users build VRML scenes by dragging objects into a creation window.

Sold on a hybrid Mac and Windows CD-ROM, Builder includes six libraries containing more than 1,200 editable objects. It also comes with Voyager, Virtus' free VRML browser; Oracle Corp.'s PowerBrowser Web browser; and a utility for converting BMP and PICT files into GIF or JPEG images.

Virtus said Builder is the first step in a line of VRML creation tools and capabilities. Virtus said it plans to unveil at the Electronic Entertainment Expo in Los Angeles in May a CORBA (Common Object Request Broker Architecture)-compliant API that will let developers create objects for VRML 2.0 scenes. These objects will include physical and behavioral properties, and designers will be able to create them using OpenDoc or Java applications.

Virtus Corp. of Cary, N.C., is at (919) 467-9700 or (800) 847-8871; fax (919) 460-4530; http://www.virtus.com.

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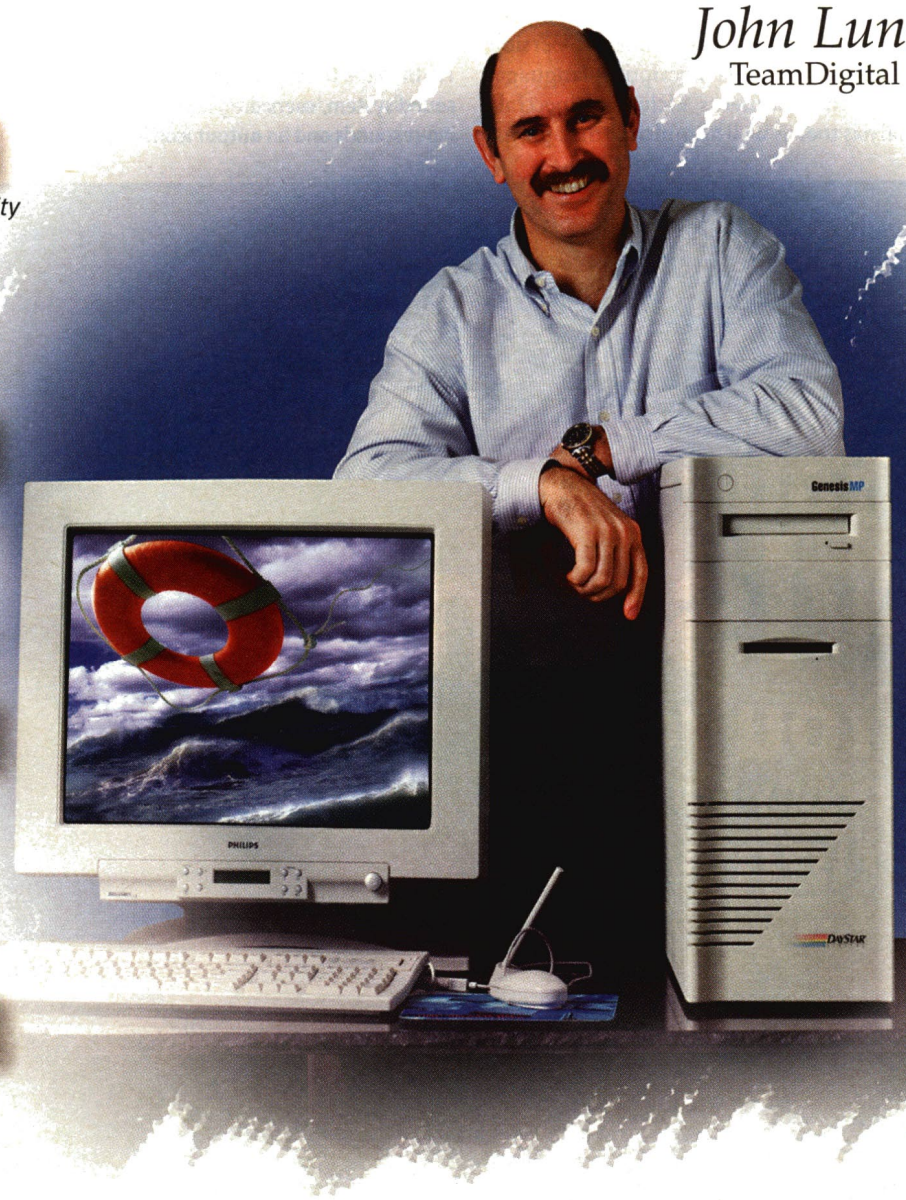

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Kyma

From Page 10

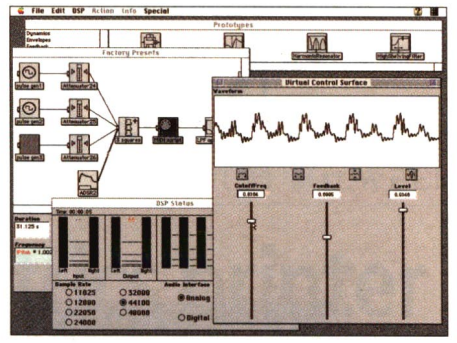
"It has the ability to morph two voices together with an actual morph, not just a cross-fade," Serafine said. "In 'Virtuosity,' a guy became a hell creature, so we morphed his voice into some weird thing, like an animal scream."

The Kyma software offers a graphical interface for harnessing the DSPs. Sounds are created by arranging processing modules (represented by icons) in a flow chart-style diagram. The package contains more than 100 modules, including delays, mixers, filters, algorithms and MIDI controls. Users can set parameters for each module by plugging in numbers, real-time data from MIDI controllers, time functions or other sound modules. Kyma can play and record audio tracks in AIFF (Audio Interchange File Format), Sound Designer I and II, .WAV, and IRCAM/MTU formats and can trigger and control disk tracks in real time using MIDI.

According to Symbolic Sound, Version 4.1 adds a new MIDI scripting language. Other enhancements include a spectral-analysis tool as well as multifile disk player and dynamic-range controller modules.

The company said a version of the system will be available for PCI Macs in May.

Symbolic Sound Corp. of Champaign, Ill., can be reached at (217) 355-6273 or (800) 972-1749; fax (217) 355-6562; http://www.symbolicsound.com. □



To drive the DSPs in Symbolic Sound's Kyma sound system, users drag icons between input sounds and an output icon.

Valis

From Page 10

things and not lose the resolution.

"I basically use it to bend things, and it makes me happy," Mooney said.

Both packages require either a Power Mac or a Mac equipped with a math coprocessor and at least 4 Mbytes of RAM.

Upgrades from any previous version of Metaflo' or Movieflo' will be $150.

In other Valis news, the company is prepping a new multimedia authoring application called infoShip. A Mac version of the $589 package, now shipping for Windows, will appear sometime in the third quarter, Valis said.

Aimed at nonprogrammers, infoShip will transform documents created with QuarkXPress, Adobe PageMaker or FrameMaker, or other desktop publishing packages into a "virtual book." Users will be able to add audio, video and animation to their multimedia presentations.

The Valis Group of Tiburon, Calif., is at (415) 435-5404 or (800) 825-4704; fax (415) 435-9862; valisgroup@aol.com. □

CYMax

From Page 10

standard SIMMs.

The CYMax 3240 comes standard with RS-232C serial and bidirectional parallel interfaces. Users can purchase a multiprotocol Ethernet interface for $1,000. The printer includes a 500-Mbyte hard drive; 2- and 4-Gbyte drives cost $1,100 and $3,100, respectively.

While Datametrics touts the CYMax 3240 for a variety of short-run printing tasks, Charles LeCompte, editor and publisher of the Hard Copy Observer in Newton Highlands, Mass., said the limited resolution and print quality of thermal transfer may constrain the printer's usefulness.

"The print quality is OK if you're doing a transparency, but you can't do high-quality text," LeCompte said.

"Applications [for the printer] are limited," LeCompte said. "[Datametrics] proposed that it could be used for on-demand printing, like an Indigo — that's ridiculous." However, the CYMax 3240 would be well-suited to high-volume slide printing or bar-coding, LeCompte said.

Datametrics Corp. of Woodland Hills, Calif., can be reached at (818) 598-6200 or (800) 472-9629; fax (818) 598-6300. □

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In Focus, Boxlight primp projectors

By Matthew Rothenberg

Two companies are training new lightweight LCD products on mobile presenters.

In Focus Systems Inc. this week is slated to ship the LitePro 210 and PowerView 820, a new multimedia projector and projection panel. Meanwhile, Boxlight Corp. in May will deliver the Boxlight Revolution Personal Projector, a video unit with Super VGA capabilities.

The LitePro 210, priced at $5,499, is based on a 24-bit-color, 6.4-inch active-matrix Sharp LCD panel with a resolution of 640 by 480 pixels. The 16-pound device uses a 270-watt metal-halide lamp to output 230 lumens, allowing the unit to project a 21-foot image. A $750 zoom lens will let users project images measuring up to 30 feet diagonally, In Focus said.

The LitePro 210 includes inputs for computer signals and video supporting Mac, VGA, Super VGA, NTSC, PAL (European) and SECAM (French) signals. It automatically detects the source and adjusts the resolution to match, the company said. It also includes a pair of JBL speakers with a 15-watt amplifier.

The CableWizard uses simple graphics and adjustable ports to simplify connecting In Focus' new projection hardware to a Mac or PC.

According to In Focus, the projector has built-in support for Eastman Kodak Co.'s Color Management System; this summer users will be able to purchase a firmware upgrade that adds the Adobe Acrobat reader.

In Focus' PowerView 820, priced at $4,499, is based on a 24-bit-color, 10.4-inch Sharp active-matrix LCD panel. According to the company, the 4.2-pound device is twice as bright as the company's earlier LCD panels. It has a maximum resolution of 800 by 600 pixels and supports NTSC, PAL and SECAM standards, as well as RGB signals.

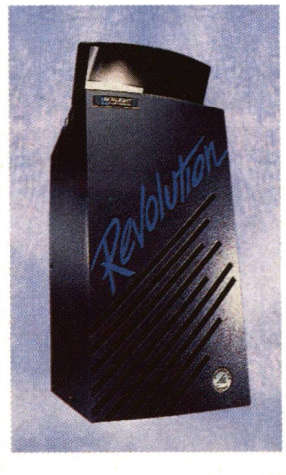
The LitePro 210 and PowerView 820 will each ship with a backlit remote that includes a trackpad. They will also include the CableWizard, a new proprietary device that In Focus said simplifies connecting the products to Intel-standard PCs and Macintoshes.

The Boxlight Revolution, priced at $5,499, weighs in at 10.9 pounds. The projector uses three single-color active-matrix LCD panels to project 24-bit-color images at resolutions up to 800 by 600 pixels. According to Boxlight, the device's 250-watt metal-halide lamp can output an image measuring up to 15 feet diagonally.

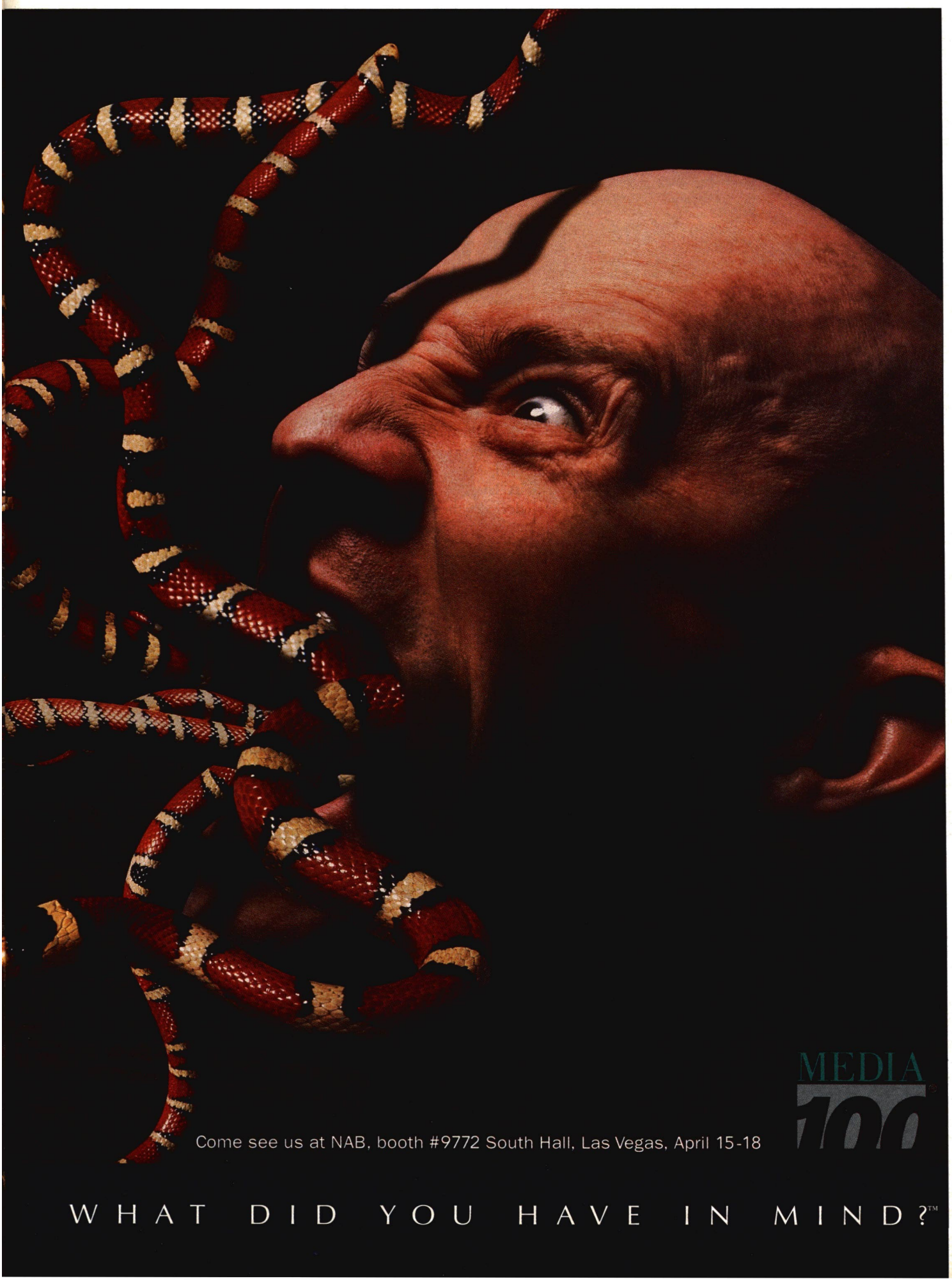
The Revolution supports only computer signals; a $500 expansion card adds NTSC, PAL and SECAM support.

In Focus Systems Inc. of Wilsonville, Ore., can be reached at (503) 685-8888 or (800) 294-6400; fax (503) 685-8887.

Boxlight Corp. of Poulsbo, Wash., can be reached at (360) 779-7901 or (800) 532-7904; fax (360) 779-3299; http://www.boxlight.com. □



You say you want a Revolution: Boxlight's petite projector weighs 10.9 pounds and stands 13 inches tall. It can project a 15-foot image.



Upcoming Navigator to boost Java support

Netscape to add Live3D muscle

By James Staten

Netscape Communications Corp. is preparing to release a new beta version of Navigator that will improve the Web browser's Java and 3-D capabilities.

Code-named Atlas, the new version is due this week for Power Macs; a 680x0 version is slated to ship next week.

Atlas will let Java applets communicate with Netscape plug-ins through JavaScript. Applets will be able to instruct a plug-in to play back a QuickTime movie, change pages in an Adobe Acrobat document or start an animation automatically. Netscape said plug-in developers will not need to modify their existing products.

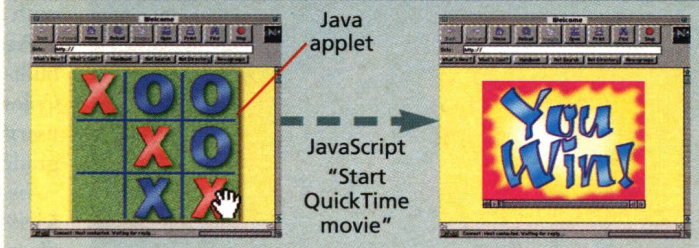
Atlas will also let users speed Java by substituting third-party tools for its components. For example, users will be able to replace the standard compiler or virtual machine with third-party versions of these tools or add a just-in-time compiler that will convert Java code into native code for a given processor, Netscape said.

The Atlas release will also be the first version of Navigator to support the Moving Worlds specification proposed for Virtual Reality Modeling Language (VRML) 2.0 (see 02.19.96, Page 1). It will include support for Moving Worlds models and scenes but not 3DMF (3-D metafile format) documents.

"3DMF support is coming

See Netscape, Page 16

Java at the helm



The Atlas release of Netscape Navigator will let a Java applet send commands to Netscape plug-ins.

OpenDoc gains fans; Cyberdog goes abroad

By Clifford Colby

Movie stars may have taken over the headlines at the end of March, but OpenDoc made several newsworthy cameo appearances that month.

Apple released the second beta of Cyberdog. The update to Apple's OpenDoc-based suite of Internet tools adds new security features, e-mail capabilities, support for QuickTime VR and several bug fixes. It is available at http://cyberdog.apple.com/download.html. An upcoming version of Cyberdog is expected to include support for Netscape Navigator plug-ins and Java applets.

Apple said it intends to have a golden master of Cyberdog ready this spring and to ship a final version by the end of summer. Apple is evaluating releasing a 680x0 version of Cyberdog this summer and a Windows version shortly after OpenDoc for Windows becomes available.

That wait shouldn't be too long. IBM Corp. of Armonk, N.Y., said it will release a beta version of OpenDoc for Windows 95 and Windows NT by June. The company said it hopes to release a 32-bit Windows version of OpenDoc at Comdex/Fall '96 in November; IBM said it does not plan to do a 16-bit version.

Meanwhile, back on the Mac side, Apple in March posted Version 1.0.2 of OpenDoc for the Mac to its Web site. The update fixes several compatibility and memory problems.

See OpenDoc, Page 17

Macromedia's Backstage act a Web builder

By James Staten

Setting its sights on Adobe Systems Inc.'s SiteMill, Macromedia Inc. in March acquired an object-oriented Web development suite and the company that built it.

San Francisco-based Macromedia laid out 860,000 shares of its stock, valued at about $32 million, to acquire iband Inc. of Campbell, Calif., and its product, Backstage.

Currently available as a public beta for Windows 95 and Windows NT, Backstage is a suite of object-oriented Web-site design tools that allow users to add discussion boards and database connectivity to their site without having to write or install multiple CGIs (Common Gateway Interfaces).

Backstage Designer is a WYSIWYG HTML editor that lets users add images, Shockwave movies and Java applets to docu-

See Macromedia, Page 17

Cards on the table at Las Vegas show

Switches, routers and hubs up ante

By Clifford Colby

Network companies will roll into Las Vegas this week and take the wraps off their latest wares at Networld+Interop 96.

▶ **Interphase Corp.** of Dallas will unveil its upcoming 25-Mbps Asynchronous Transfer Mode (ATM) cards designed for desktop machines. The offering, due in May, will include a $345 PCI card with Mac drivers.

▶ **Shiva Corp.** of Bedford, Mass., will debut its latest remote-access device, the high-end modular LanRover Access Switch. It will come with ISDN (Integrated Services Digital Network) and modem connections and route AppleTalk, TCP/IP and IPX traffic. Shiva said the server will handle 100 simultaneous sessions and start at $23,000.

▶ **Ipsilon Networks Inc.** of

See N+I, Page 17

Pick a port, any port: Zyxel's Prestige 2864I Remote Access Router will come with Ethernet, analog and ISDN ports for remote connections.

Excel tool produces HTML tables

By James Staten

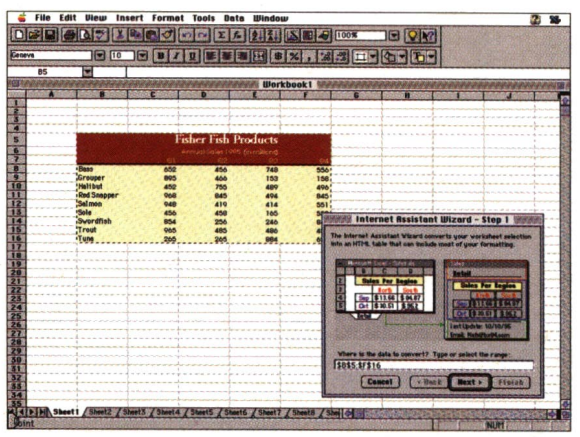
Excel experts can now show off their talents on the Web, thanks to a new tool released this month by Microsoft Corp.

Internet Assistant for Microsoft Excel is a free utility that walks users through the process of converting spreadsheets into HTML tables. The new wizard lets users maintain text formatting and background colors within a table and specify where in the Web page the table is to be placed. After the conversion, Internet Assistant inserts the HTML table into the receiving Web page.

Internet Assistant for Microsoft Excel is a single cross-platform tool that works with Excel 5 for Mac, Power Mac, Windows 3.1 and Windows NT, as well as Excel 7.0 for Windows 95 and NT 3.51.

The tool can be downloaded from Microsoft's Web site at http://www.microsoft.com/macoffice or from the Microsoft area on CompuServe at go: msexcel.

Microsoft Corp. of Redmond, Wash., can be reached at (206) 882-8080 or (800) 426-9400; fax (206) 936-7329.



Microsoft's Internet Assistant for Excel lets spreadsheet wizards strut their stuff on the Web.

true color

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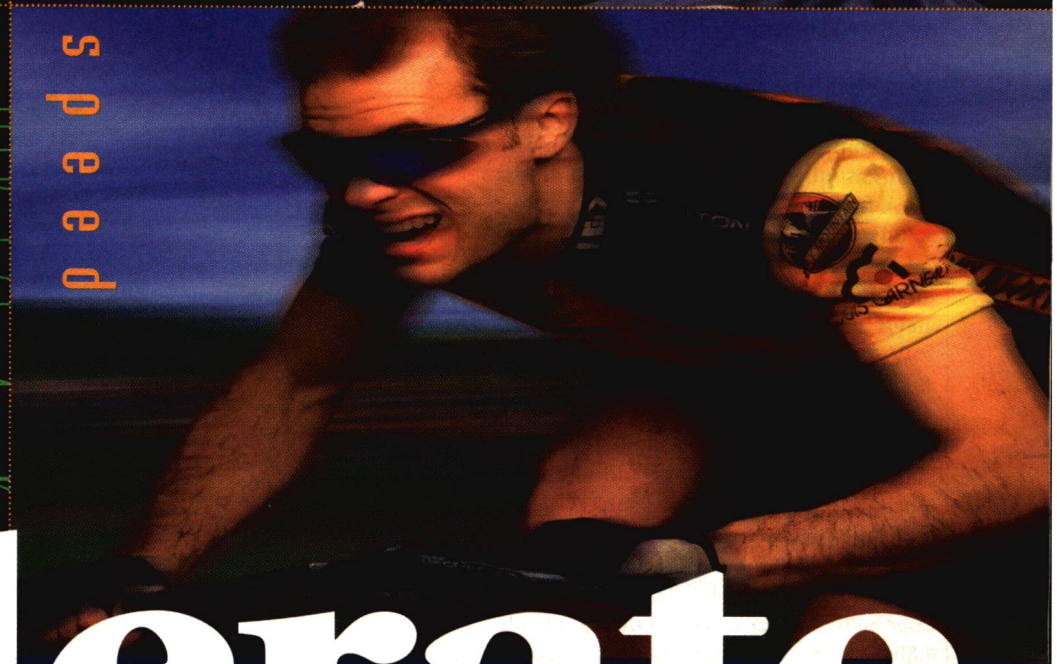

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MacBench 3.0 publishing graphics mix test performed on Power Mac 9500/132 with 40MB of RAM @ 1152 x 870 in 16.7 million colors with Matrox Millennium for PCI Power Mac, Number Nine Imagine 128, IMS Twin Turbo 128 and Radius Thunder 30/1600.

QuickMail 3.6: It's native

CE also delivers new QM-Internet Gateway

By Joanna Pearlstein

Bringing a Power Mac-native client to its e-mail package, CE Software Inc. shipped QuickMail 3.6 in March.

In addition to a Power Mac-native client the new version adds Open Transport compatibility and a new Master Address Book that eliminates the need to verify addresses to maintain correct listing, CE said. The company has also raised the maximum number of addresses in one address book from 254 to 1,000.

CE said it has also simplified Internet addressing, which, "cuts the number of steps required in half," said Christian Gurney, CE vice president for product lines.

Version 3.6 marks the return of QuickSend, a feature that allows users to send files via QuickMail from any application; the feature was removed in Version 3.0. The new QuickSend is a stand-alone application. CE will release an API for QuickSend that will let developers add new functions to the tool.

While the QuickMail 3.6 client is Power Mac-native, the server remains mostly 680x0 code. Gurney said significant changes were not made to the server.

Upgrades from Version 3.5 cost $3 per user; pricing for upgrades from previous versions vary.

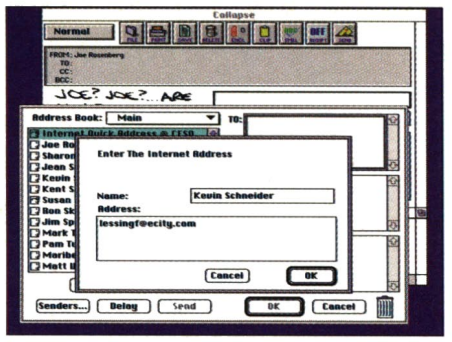
Gurney said the next update to QuickMail will provide TCP/IP support that will let users check their QuickMail over the Internet.

CE also shipped the QM-Internet Gateway, an SMTP (Simple Mail Transfer Protocol) gateway that connects QuickMail to the Internet. The gateway, which is compliant with MIME (Multipurpose Internet Mail Extensions), can run on the same machine as a QuickMail server.

QM-Internet Gateway supports Post Office Protocol, file enclosures, file encoding, address aliasing and group addressing. The QM Forms tunneling feature preserves a message's font and graphics when sent to another QM-Internet Gateway.

The product will sell for $1,995 through May 31, at which time its price will increase to $2,495.

CE Software Inc. of West Des Moines, Iowa, can be reached at (515) 221-1801 or (800) 523-7638; fax (515) 221-1806; sales@cesoft.com; http://www.cesoft.com. □



CE Software has simplified Internet addressing in QuickMail 3.6. The new version also includes a master address book and the return of the popular QuickSend feature.

Netscape

From Page 14

later," said Alex Edelstein, Navigator senior product manager at Netscape. "Apple has committed to write [a Moving Worlds version of 3DMF] but hasn't written it yet." Edelstein said the current version of the 3DMF specification is too general-purpose for use with VRML.

Moving Worlds support will be provided by the inclusion of Live3D, a 3-D rendering technology developed by Paper Software Inc., which Netscape acquired earlier this year. Netscape said Live3D support will allow Navigator plug-ins to run in 3-D scenes. For example, Web designers will be able to map QuickTime movies onto objects in a VRML world, and a QuickTime plug-in will play back the clip.

Netscape Communications Corp. of Mountain View, Calif., can be reached at (415) 528-2555; fax (415) 528-4140; http://home.netscape.com. □

N+I

From Page 14

Palo Alto, Calif., will show off the first member of what it calls its family of IP switches. Ipsilon said the $46,000 IP Switch ATM 1600 will come with 16 155-Mbps ATM ports and combine switching with Internet Protocol routing.

According to the company, the switch, due this month, will be able to dynamically shift between store-and-forward and cut-through modes of switching, depending on the type of traffic.

▶ **Dayna Communications Inc.** will unveil its upcoming Fast EtherPrint bridge, which will connect a 10-Mbps Ethernet printer to a 100-Mbps Ethernet network. The Salt Lake City company said it expects the print server to ship in June.

▶ **Allied Telesyn International Corp.** of Sunnyvale, Calif., will show its new line of TurboStack hubs, switches and chassis. ATI said it plans to offer 10- and 100-Mbps Ethernet as well as ATM links in its new line. ATI will also have on hand its new line of dual-speed 10/100BASE T PCI cards. The company said it expects to ship a version of its $235 AT-2560TX card for PCI Macs by fall.

▶ **Fore Systems Inc.** of Warrendale, Pa., will make several announcements.

The company said it plans to unveil the next version of its ForeView network management software. The new version will provide a graphical interface for configuring and managing virtual LANs. Fore will also release Version 4.0 of its ForeThought software, beefing up the application's LAN emulation capabilities. On the hardware side, the company will debut 155-Mbps ATM modules for its PowerHub 7000 and ES-3810 switches.

▶ **Zyxel Communications Inc.** of Anaheim, Calif., will roll out its $1,095 Prestige 2864I Remote Access Router. The device, due this spring, will route AppleTalk, TCP/IP and IPX traffic and come with ISDN, Ethernet and analog connections. □

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OpenDoc

From Page 14

March also saw Object Management Group Inc. of Framingham, Mass., announce that it was adopting the OpenDoc technology as its specification for component software. The Object Management Group is a consortium that promotes a common architectural framework for object-oriented applications (see 03.25.96, Page 7).

In related news, Sun Microsystems Inc. of Mountain View, Calif., unveiled Joe, a tool based on CORBA (Common Object Request Broker Architecture) that will link Java applets running in a Java-enabled browser with CORBA-compliant server applications. CORBA is an OMG standard that defines interactions among objects.

Finally, Component Integration Laboratories Inc. of Sunnyvale, Calif., announced it will offer this summer a software-validation tool for the Mac and OS/2 platforms that will test the functionality of OpenDoc components.

CI Labs said it will provide Windows and Unix versions of the tool when OpenDoc is available on those platforms. □

Macromedia

From Page 14

ments. Backstage Desktop Studio includes Designer and adds Backstage Objects, 16 tools that can be dragged and dropped into Designer documents to add connectivity to desktop databases, forms and threaded discussion groups. Backstage Enterprise Studio takes Desktop Studio and adds tools to access client-server databases.

Macromedia said Mac and Unix versions of the product are in development along with a software development kit that will let programmers add new objects to Backstage. Pricing and availability have not been announced.

Corel Corp. of Ottawa licensed Backstage in March and said it plans to offer Designer as part of a new $99 Internet authoring suite for Windows set for release this month.

Macromedia said iband has been fully absorbed and all its employees are moving to Macromedia's San Francisco and San Mateo, Calif. locations. Anthony Wood, former president of iband, is now vice president of Internet Authoring at Macromedia. □

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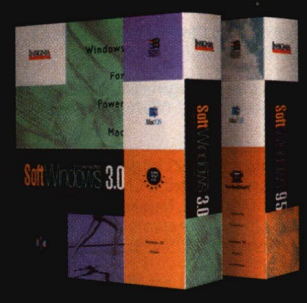

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BPA INTERNATIONAL

Cyberdog is not a strategy

Looking at the company's moves over the past year, we've found it difficult to determine Apple's commitment to the sprawling mess known as the Internet and the Web.

Apple has done a few things right: It has come out with Internet servers, scraped together a client-side bundle for connecting to the Internet, and spearheaded an alliance with Netscape Communications Corp. and Silicon Graphics Inc. over Virtual Reality Modeling Language.

Despite these positive steps, Apple has also stubbornly pursued a policy of nonaction. It has sat on the sidelines while Netscape Navigator has bloomed and Sun Microsystems Inc.'s Java has become the driving force behind Web development. All we hear about is Cyberdog, the great unshipped browser. Unfortunately, while Apple toiled over Cyberdog, Navigator 2.0 shipped, without the range of browser plug-ins that were available for Windows and Unix.

Apple has largely remained on the bench, and the Mac, long lauded as the ultimate client, has languished with incomplete Internet applications and tools.

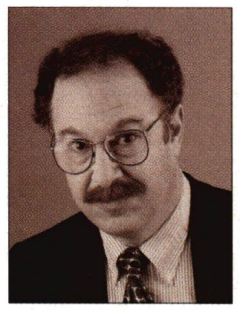
The Web is a platform on which developments are appearing at a furious pace. Apple needs to move fast to catch up with companies such as Sun, Netscape and its old nemesis, Microsoft Corp., which has now decided to go head-to-head with Netscape. Microsoft appears to view Netscape as the biggest threat to the Windows hegemony, and Apple can play the role of the spoiler if it wants to.

Apple recently named Larry Tesler vice president of Internet platforms, and we have some concerns and questions. Will he prove that Apple is truly serious about the Internet? Or is he a member of the old school, the Apple visionary who thinks in terms of the future, not the products of the here and now?

"The first thing to do will be to articulate our Internet strategy," Tesler proclaimed in a statement typical of one's first day on the job. We hope that he realizes Apple needs to do this soon, and with authority. □

THE SECOND DECADE HENRY NORR

'A' for effort, not results, in System folder cleanup



Oddly enough, testing System 7.5 Update 2.0 over the past few weeks took me back across several careers to the early 1970s, when I worked as a machinist for General Electric Co. I'd lucked into a plum position — a job on the elite crew responsible for keeping the plant's production equipment up and running.

The machinery was an uneasy mix of old and new — state-of-the-art process-control systems running side-by-side with presses that had been stamping out sheet-metal parts since World War I. (There's an analogy to the current Mac OS, but we'll leave that one aside.) I was more than a little out of my depth, but I tried to make up for it by putting extra time and effort into each project.

That didn't sit well with Tony, a grizzled senior machinist and shop-floor philosopher who took me under his wing. Almost every week, when he'd get tired of watching me sweat over some chore he could handle in a flash, he'd take me aside and try to teach me how to apply his favorite adage: Don't work harder, work smarter.

Sweeping the stable

What brought Tony to mind was watching Apple's update installer trying to tidy up my System folders. To the company's credit, the installer tries harder than any other I can remember to locate and update or delete obsolete components. Unfortunately, the outcome is disappointing. Sometimes the installer just screws up. In several cases it inexplicably failed to delete files it was supposed to, including such familiar but now unnecessary fixtures as MathLib and ThreadsLib, and neglected to update others, even basics such as the LaserWriter driver.

Such execution errors are troubling, but in this context I'm even more concerned about another class of problems I ran into. The installer wouldn't touch files I'd renamed, even though all I'd added was a version number. It isn't prepared to deal with anything from pre-7.5 systems, though I'm sure I'm not the only user with flotsam and jetsam like DragLib still around. On my Performa 5215, I couldn't watch TV after the update because the installer thought Apple Video Player 1.2 was newer than 1.4 — because the former had acquired a creation date of Feb. 6, 2040. And when I updated an external drive from a Power Computing Corp. PowerCurve, the installer left Serial Update 406 (an obscure 52xx extension) in place because, according to the Apple engineer I reported it to, the development team didn't expect to find it on PCI systems.

Take it from Tony

Apple could solve some of these problems by working harder — giving the installer a longer list of files to delete, teaching it about version numbers and so on. But there's no way even an army of engineers could anticipate, let alone script the installer to do the right thing with, every possible combination of hardware and software. And as more component software arrives, the problem will only get worse.

Apple should take Tony's advice: It's time for a smarter solution. I'll share some ideas about that in an upcoming column. □

Henry Norr, editor emeritus of MacWEEK, welcomes feedback in the MacWEEK forums on CompuServe or at henry_norr@macweek.com.

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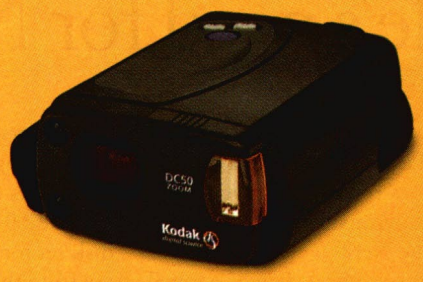

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LETTERS

A taxing situation

Your Solutions article on small-business accounting software (02.26.96, Page 49) has done your readers a great disservice. Small businesses account primarily for tax purposes. Failure to do so may subject a small business to an audit, penalties and quite possibly bankruptcy. Tax accounting is no trivial matter.

Unfortunately, most software companies treat tax accounting as an unimportant byproduct of using their software. Even Intuit Inc.'s QuickBooks fails to account for inventory using federally required methods.

Government regulations require any business maintaining inventory to use either first-in-first-out, last-in-last-out or specific identification inventory methods. All small-business accounting software packages that were recently discussed in MacWEEK use a moving average inventory method that violates these government regulations. A user of such software faces two alternatives: (1) pay an accountant to reconstruct all inventory transactions for a business using lawful methods; or (2) risk Internal Revenue Service penalties at an audit.

A business must also attribute indirect expenses to actual direct inventory. That means a business must account for the rent, utilities, acquisition costs, etc., that pertain to inventory. Yes, the rent for the floor space and the electricity to light the space used by inventory must be accounted for apart from other expenses. This essentially requires a "cost accounting" methodology, which is not supported by any software short of that from Great Plains Software Inc.

The pathetic thing is that the technology is readily available. It is not hard to implement. Software companies just need to read the tax laws. MacWEEK is practically negligent by failing to report these shortcomings to its readers, who recommend software to end users based on your article.

Tom Anderson
President
Para Technologies Inc.
Beaverton, Ore.

MacInTouch delivers

I just had to write a note of praise for Ric Ford's advice (03.11.96, Page 33).

I spent several hours downloading System 7.5 Update 2.0 (7.5.3) only to find out that RAM Doubler 1.6.1 crashed my PowerBook 540c every time I put it to sleep. I talked to Apple and Connectix Corp., but it seemed a surprise to both.

I had just received MacWEEK and immediately went to MacInTouch.

I called up the MacInTouch home page and found out that I can recover by installing MacsBug. Wow! I couldn't get better help if I paid big bucks for it. No wonder I drop everything else when MacWEEK comes.

Steve Frawley
Owner
Tax, Accounting and Computer Services Co.
Fort Collins, Colo.

The people factor

Don Crabb, wake up! Stick your head up out of your cubicle! The Software Publishers Association comparison of the Mac to Windows was fantastic (03.18.96, Page 27). I wasn't there, but the results prove beyond the shadow of a doubt the importance and reality of Macintosh ease of use. As an Authorized Apple Product Representative (OK, I'm biased) and Mac manager, I've had students and faculty confront me daily, and I can firmly attest that installing modems and Iomega Corp. Zip drives and connecting to printers and the Internet are tasks that *people* with computers of all types are concerned about. In 10 years as a Mac manager, I've never had anyone ask about copying 5,000 files in 500 folders. I've never even see it in a user study of computing.

Sure, Windows is good. It might even be better at some things, but those things are worthless if you can't figure out how to print or send e-mail.

Kelly Thomas
Microcomputer specialist
Southern Illinois University
Carbondale, Ill.

Can't slide for a second

I agree completely with Don Crabb about Copland (02.19.96, Page 19). The rest can slide to 1997 and no one would notice. If Copland slides 30 seconds, everyone will say nasty things about how Apple is obviously behind and failing.

Char-Lez B. Braden
Database administrator
Global Village Communication Inc.
Sunnyvale, Calif.

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THE MAC MANAGER DON CRABB

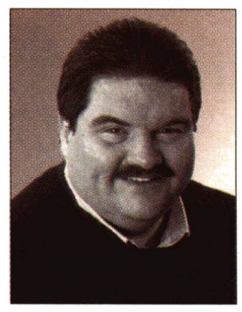
Update logjam emphasizes Apple's need for Net savvy

How many of you "stood in line" waiting to download Mac OS System 7.5 Update 2.0 the week of its release? Did you bang every FTP and mirror site to get it? Or online services? The Net?

I was waiting with you. It was a royal pain. The FTP and mirror sites were jammed from the get-go.

But we were duly warned. Apple buried this lovely note far into its Web page description of the download process:

"Due to the high demand of this update, you may need to try several of the sites repeatedly to download the files." Duh. (We need an applet that keeps trying to download the update, so we don't have to do it ourselves.)



If you bailed from Apple's servers, you found that the online services took so many hits that downloads often aborted midstream. Many people just gave up and called Apple to order the upgrade on CD or floppies for $13.

Unfortunately, those folks are probably still waiting for their upgrades, and that's no April Fool's joke — since System 7.5.3 purports to fix so many Mac OS problems.

This is only a test

As a test, I called the toll-free number on March 11 to buy the upgrade on floppies or CD with my credit card hot in my hand.

First of all, it took nearly all day to get through to an order taker. (I love listening to recorded patter telling me to stay on hold, don't you?) When I did get through, I got put on hold three times. Fun stuff.

Finally, my order was taken. I could feel my Macs getting better just at the thought of the upgrade on its way. Then they told me it would take two to six weeks for the CD to arrive. Six weeks! Are you kidding me? I was assured they were not.

Of course, Apple's thoughtful Web page announcing the upgrade had warned me about this too: "You can order System 7.5 Update 2.0 on a CD or a high-density floppy disk set for $13 shipping and handling plus tax from the Apple Order Center by calling 1-800-293-6617, Ext. 984. The CD-ROM or floppy set will ship around March 29."

Making it better

All of this points to one inevitable conclusion — the Web is becoming the software update location of choice for Mac users. Despite Apple's best efforts to provide multiple FTP sites; mirror sites; and instructions on using America Online, CompuServe or AppleLink, its System 7.5.3 Net-update effort satisfied only a fraction of all the Mac customers wanting and needing the update.

Here is where Apple has a real shot at improving software distribution mechanisms and setting a standard for the industry. By building much more robust update servers, capable of handling hundreds of times the download traffic as their current servers, Apple could show the entire software world that it is the leader in Internet software distribution. Plus, Apple could join with developers to build the software and hardware these robust update servers will need.

By Copland's arrival Apple could have this working — tied to a secure charge mechanism so we can all ante up from our Mac OS update budgets. That would show leadership on the Internet that Apple needs to establish. □

Don Crabb welcomes comments at his Internet address decc@cs.uchicago.edu. You can also check out his home page at http://cs-www.uchicago.edu/~decc/.

Comments? Ideas? Contact Eli at elitoons@aol.com

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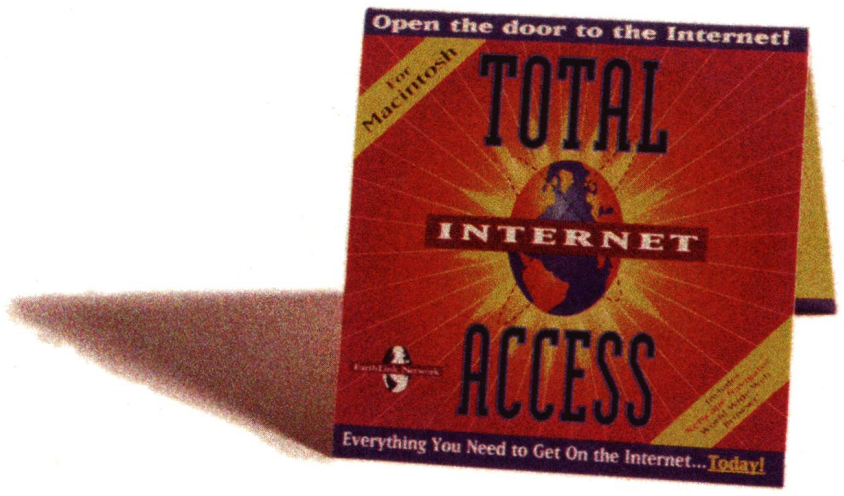

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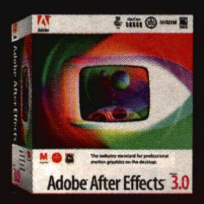

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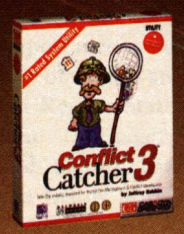

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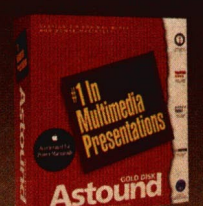

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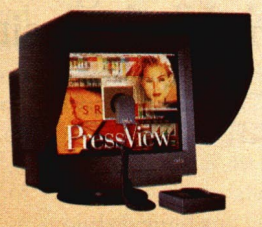

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12. Manufacturing
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15. Finance: Banking, Accounting, Insurance, Real Estate, Legal
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☐01. System 7
☐02. System 6, 5 or earlier
☐03. Unix/Xenix/AUX/AIX
☐04. PowerOpen
☐05. Windows 3.X
☐06. Windows NT
☐07. Windows 95
☐08. NeXTStep
☐09. Solaris
☐10. OSF/Motif
☐11. Other_____ (please specify)

Network Operating Systems
☐13. Novell NetWare
☐14. Unix/NFS
☐15. LAN Manager
☐16. Banyan VINES
☐17. AppleShare
☐18. DEC PathWorks
☐19. Other_____ (please specify)

Groupware
☐21. Lotus Notes
☐22. Windows for Workgroups
☐23. FirstClass
☐24. Novell GroupWise
☐25. Apple Open Collaboration Environment (AOCE)
☐26. Other_____ (please specify)

Database Engines
☐28. Oracle
☐29. Sybase SQL Server
☐30. Ingres
☐31. Informix
☐32. 4D Server
☐33. DB2
☐34. Other_____ (please specify)

On-Line Services
☐36. America Online
☐37. CompuServe
☐38. e-World
☐39. Prodigy
☐40. Internet
☐41. Delphi
☐42. Genie
☐43. Other_____ (please specify)

4 Please indicate the quantities of the computers currently installed and indicate the computers planned for purchase in one year at this *entire* location.

(Write in accurate quantities for all that apply.)

	Currently Installed (Quantity)	PLAN TO PURCHASE
Macintosh/Compatible		
Apple Power Mac 8100	1.	1.☐
Apple Power Mac 7100	2.	2.☐
Apple Power Mac 6100	3.	3.☐
Radius Power Mac Compatible	4.	4.☐
Power Computing Power Mac Compatible	5.	5.☐
Daystar Power Mac Compatible	6.	6.☐
Other Power Mac Compatible	7.	7.☐
Macintosh Quadra	8.	8.☐
Macintosh Centris	9.	9.☐
Macintosh Performa	10.	10.☐
Macintosh PowerBook	11.	11.☐
Macintosh Duo	12.	12.☐
Macintosh Other (II, LC, SE, etc...)	13.	13.☐
Other Mac Compatible	14.	14.☐
Other Desktops		
IBM/Compatible Desktop/Laptop/Notebook	15.	15.☐
PowerPC (Non-Mac Compatible)	16.	16.☐
Workstation (SPARC, MIPS, HP/Apollo, etc.)	17.	17.☐
Other Microcomputers	18.	18.☐

USE NUMBERS ONLY

5A How many servers are installed at this *entire* location? (Use numbers only)

5B How many LANs are installed at this *entire* location? (Use numbers only)

5C How many Macintoshes are connected to the LANs indicated in Question 5B above? (Use numbers only)

6 If applicable: how many Macintoshes are sold, resold, or recommended in one year at this *entire* location? (Answer one only)

A. Retailer: Number sold per year_____
B. Reseller: Number resold per year_____
C. Consultant: Number purchased by your clients through your firm's recommendation per year_____
D. Other: Number sold/resold/recommended per year_____
☐ E. Not Applicable

7A Which of the following Macintosh-related products do you specify, recommend, buy or approve the purchase of? (Check all that apply)

Systems
☐01. Apple Macintoshes
☐02. Mac Compatibles
☐03. IBM Compatible Micros
☐04. Servers
☐05. Workstations
☐06. Minis/Mainframes
☐07. Newton PDA
☐08. Pen-Based Computers

Networking
☐10. LANs
☐11. WANs
☐12. Mac to PC Links
☐13. Mac to Mini/ Mainframe Links
☐14. Mac to Unix Workstation Links
☐15. Modems
☐16. Communication/ Network Software
☐17. Bridges/Routers/ Gateways
☐18. Hubs
☐19. NICS

Printers
☐21. Laser
☐22. Color Laser
☐23. InkJet
☐24. Color InkJet
☐25. Dye Sub
☐26. Thermal Wax
☐27. Plotter
☐28. Portable Printer

Image Input
☐30. Digital Camera
☐31. Flatbed Scanners
☐32. Handheld Scanners
☐33. Slide Scanners
☐34. Drum Scanners
☐35. Black/White Scanners

Displays
☐37. 14 inch
☐38. 15 inch
☐39. 17 inch
☐40. 21+ inch
☐41. LCD Projection Panel
☐42. Presentation Monitors

Peripherals
☐44. UPS
☐45. External Speakers
☐46. Input Devices
☐47. Video Deck
☐48. Image Setter

Storage
☐50. Photo CD
☐51. Magneto Optical
☐52. RAID
☐53. Hard Drive 1 Gig +
☐54. Hard Drive < 1 Gig

Add-In Boards
☐56. CD Recorder
☐57. Memory Boards
☐58. Display Boards
☐59. Video Digitizer Boards
☐60. Accelerator Boards
☐61. Sound Boards
☐62. MIDI
☐63. Video Capture/ Compression
99.☐ None of the above

Your Signature _____

Title _____ Date ___/___/___

7B Which of the following systems and/or applications software do you specify, recommend, buy or approve the purchase of? (Check all that apply)

Graphic Arts
☐01. Desktop Publishing
☐02. Electronic Publishing
☐03. Painting/Drawing Programs
☐04. Photo Retouching
☐05. Page Layout
☐06. Illustration Programs
☐07. Fonts
☐08. Pre-Press
☐09. Color Management
☐10. Digital Video
☐11. Other_____ (please specify)

Multimedia
☐13. Authoring Software
☐14. Video Editing
☐15. Sound Editing
☐16. Music Composition/ Editing
☐17. Animation
☐18. Clip Media (Sound and Art)
☐19. Other_____ (please specify)

Presentation Graphics
☐21. Presentation Software
☐22. Multimedia Presentations
☐23. Charting Program
☐24. Other_____ (please specify)

Design/Engineering
☐26. CAD/CAM
☐27. 2/D - 3/D Modeling
☐28. Simulation
☐29. Other_____ (please specify)

Business Applications
☐31. Word Processing
☐32. Spreadsheets
☐33. Databases
☐34. Project Management
☐35. Accounting/Payroll
☐36. Groupware
☐37. Desktop Video Conf.
☐38. Document Management
☐39. Mapping/GIS
☐40. Pen-Based Applications
☐41. Other_____ (please specify)

Systems Management
☐43. Operating Systems
☐44. Utilities
☐45. Applications Development
☐46. CASE
☐47. Programming Languages
☐48. Compilers
☐49. SQL Applications
☐50. Client Server Applications
☐51. Other_____ (please specify)
99.☐ None of the above

8 If you indicated purchasing involvement for computers, computer products or services in Question 7A or Question 7B, for how many Macintoshes do you have this involvement? (Select one only) Write Answer Here ➡

01. 2000+
02. 1000-1999
03. 500-999
04. 100-499
05. 50-99
06. 20-49
07. 10-19
08. 5-9
09. 1-4
99. None

9 For what applications are the Macintoshes at your location used? (Check all that apply)

☐ 01. Graphic Arts
☐ 02. Presentation Graphics
☐ 03. Multimedia
☐ 04. Design/Engineering
☐ 05. Business Applications
☐ 06. Systems Management
☐ 99. Other_____ (please specify)

10 Over the course of one year, do you specify, recommend, buy, or approve the purchase of host systems, desktops, networking products, peripheral equipment and/or software worth: (Write number in box)

1. $5,000,000 or more
2. $2,500,000 to $4,999,999
3. $1,000,000 to $2,499,999
4. $600,000 to $999,999
5. $400,000 to $599,999
6. $200,000 to $399,999
7. $100,000 to $199,999
8. $50,000 to $99,999
9. $25,000 to $49,999
10. $10,000 to $24,999
11. Less than $10,000
99. None

Product Category	For this location (Write number in box)	For other locations (Write number in box)
Host Systems (Mainframes/Minis)	A.	G.
Desktops/Portables (Micros/Workstations)	B.	H.
Networking Products (include Servers)	C.	I.
Peripheral Equipment	D.	J.
Software Products	E.	K.
Service/Support	F.	L.

Indicate additional individuals at this location who might qualify for a FREE subscription to MacWEEK:

Name _____ Title _____

Name _____ Title _____

Name _____ Title _____

PLEASE BE SURE THAT ALL QUESTIONS ARE ANSWERED. V9601

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Division | Mail Stop Delivery

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MacWEEK

Guide to the Internet

Getting a Web site up and running was the easy part (see 11.13.95, Page 34); the real work is in creating a place users will want to visit over and over. MacWEEK shows what has made Salon a hit with readers and discusses the important issues in managing a Web presence.

ILLUSTRATIONS BY SCOTT BALDWIN

Ten essential steps for maintaining a Web site

By Jeff Ubois

The currency of the Web — information — is fragile, and information spoilage is never more than a few weeks or months away. Keeping the cobwebs out of a site requires not only a source of fresh content, but the time, commitment and resources to make it presentable.

Managers who have created successful sites say that, most important of all, it requires attention to different audiences: people within the organization who need information, people who want to publish it, managers who want to know what it all means (and what the return on investment really is), customers and suppliers.

But it also means planning for growth, selecting good tools, adding new services, publicizing the site and creating links to legacy data.

1. Managing traffic and performance

There are two aspects to Web-site capacity: network bandwidth and server hardware.

Of the two, bandwidth is usually the more important constraint. "Lots of people think you need a massive Unix box for a 56K line, but why spend $15,000 for that when you can serve (and saturate) a 56K line with an SE/30," said Chuck Shotton, author of MacHTTP and WebStar.

Still, there are different ways to fill up a T1. "One hundred 14.4 users will fill a T1 line differently than 10 T1 users. Sometimes the sheer number of connections can max out a site before you run out of bandwidth," Shotton said. "In that case, you may be better off getting a more powerful server — but remember, anything more than 30 to 40 simultaneous connections will max out a T1 line."

Shotton said that if you are going to add machines, "it's better to add like to like." (Users can find a white paper describing how to scale at http://louvx.biap.com/performance/.)

For some users, though, sites are a mix not only of Macs, but of Macs, Windows and Unix boxes. The American Association for the Advancement of Science in Washington, D.C., for

See Sites, next page

Sites

From previous page

example, is running its site on an Apple Workgroup Server 9150 and using a Unix server to host its Science magazine. "If you can serve pages faster you are less likely to saturate the line," said Clifton Martin, an AAAS computer specialist. "Sure, 30 users can saturate a line, but if you can serve pages faster, it's a lot less likely."

2. Keeping the end-user perspective

For end users, the look and feel of a Web site depends on the browser and the speed of the network connection.

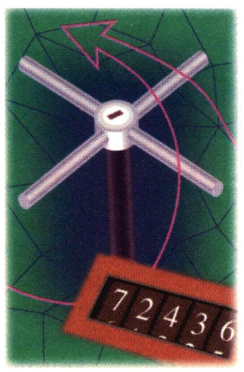
While Netscape Communications Corp.'s Navigator is clearly the dominant browser, it's not the only one out there. Make sure users with other browsers can also read every page.

"Offering Netscape-only pages is like having a store that says, 'Sorry, we only serve blondes here,' " said Rick Tracewell, a partner in Scotts Valley, Calif.-based TNT Media Inc., which produces the Internet Mall.

Serving every browser is getting harder because the HTML standard is fragmenting. That's unfortunate, but proprietary extensions to Web standards aren't going to disappear, and different browsers will continue to present the same page in different ways. "It started with tables, which first raised the question of whether you build a second set of pages for people who don't have Netscape or just decide you won't serve them," Tracewell said.

"We haven't avoided tables, but we also try to have a version of each table that is straight text, and that second set of pages can be a pain," Tracewell added. "I check our sites with as many browsers as possible and, in fact, I keep an America Online account specifically to check how our sites look with their browser."

The other aspect of building to suit the audience is bandwidth, which determines the appropriate page size. Users on 28.8-Kbps links, for example, need about one second per kilobyte to download a page, which means that large graphics aren't appropriate. "We design for 28.8 and figure people with faster modems will like our sites all the more," Tracewell said.

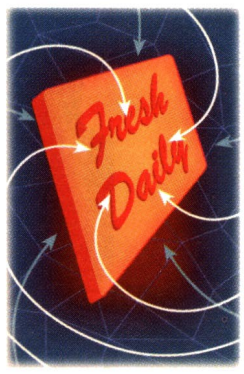


On the other hand, some sites operate under the assumption that the end users are on high-speed links. "We have also worked on pieces of an intranet for Silicon Graphics [Inc.], and since everyone there is on a T1 or T3, I don't worry about bandwidth as much," Tracewell said.

3. Acquiring data, keeping it fresh

In many environments, gathering data for a Web site is like pulling teeth. "Getting people to give you their data is the hardest part, and we spend more time doing that than anything else," said Tom Neal, manager of operations for NT Crossroads at NorTel in Richardson, Texas. "We've got our system built, but the technology is empty until you have information to add.

"You have to attack the problem from the top down and get upper management involved, because at a company this size you can't brief every senior manager with a piece of information that should be on the server," Neal said. "If you say to people, 'We need information for the corporate Web server,' they just look at you strangely. You have to get to the division managers and get them to change their reporting structure."



Shotton suggested that managers create systems that make it easy to publish data on the Web. "The best thing is to have content development tools that people can use as part of their normal work process," he said. "For example, some people just take their Microsoft Word documents, put them in a folder, index them with AppleSearch and put them up on the Web."

Other tools can help keep a site looking fresh without consuming a lot of time. "The trick is to make it easy and to automate the changing of the content," Shotton said. "NetCloak (from Maxum Development Corp.) has lots of utilities for randomizing content with pictures and messages depending on the time of day or day of the week or browser, so it lets you change the appearance of your site without a lot of manual labor."

Another approach is to forge links to external sites with rapidly changing databases. "We have a script that checks the stock market, and there are lots of things like that you can set up one time to provide variable content you don't have to maintain," Shotton said.

4. Developing usage logs and stats

Back in the early days of radio, stations used to weigh the stacks of listener mail to determine which programs were the most popular. Fortunately, Web managers can be a bit more exact.

Server logs can help identify user populations, spot performance problems and even adjust the structure of a Web site to put popular resources on top.

Statistics are also needed to develop advertising revenue. "We use [Kitchen Sink Software Inc.'s] ServerStat to analyze the logs, and that's useful because we do some advertising and charge people to be on our site," said AAAS' Martin. "We are also looking at [EveryWare Development Corp.'s] Bolero, which seems to track everything you might want to know."

Finding the right measurement scheme is very much an individual matter. Shotton, for example, is using a script to count how many demo copies of his software are downloaded every day. New measurement software should help. "One of the coolest new tools is Bolero, which is complementary to [Kitchen Sink's] WebStat and gives you a full-blown click-trail analysis," Shotton said. "It is a really impressive piece of software that does real-time statistics gathering for marketing and sales."

One of the most important reasons to keep stats, according to Shotton, is that "people further up the food chain want to see them."

5. Calculating your ROI

Web sites can pay off in a variety of ways — reducing costs for printing, technical support and phone calls; building customer relations; improving internal information sharing; and even boosting direct sales. Whatever the payoff, find ways to demonstrate it inside the organization.

"If you can't measure your site on the basis of fulfilling business results, you are probably not doing the right thing," said Greg Stuart, senior vice president and director of interactive communications at Wunderman, Cato & Johnson, a New York-based marketing firm. "With the Web and on-line services, we know exactly how much it costs us to acquire new customers or maintain existing relationships."

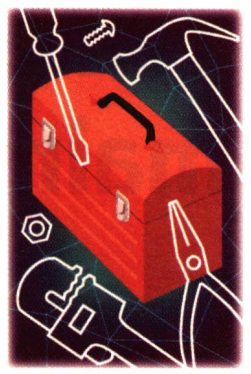
Again, good server logs can help. Charles Mokotoff, a Webmaster at the Division of Computer Research and Technology at The National Institutes of Health in Bethesda, Md., said, "We have to justify our existence to upper management, and we've used the WebStar logs to show we're not just playing around.

"We use WebStat to analyze our WebStar log so we get a good idea of which pages are being hit most often and from where," Mokotoff added. "We have also talked about using the statistics to adjust the structure of the Web site."

6. Choosing tools

Tools for Web-page creation, site management and content production are evolving rapidly, and selecting the right one can save hundreds of hours of production time.

Three page-creation and site-management products are particularly worth watching: Microsoft Corp.'s FrontPage, Netscape's Navigator Gold (both soon to be released for the Mac), and Adobe Systems Inc.'s PageMill and SiteMill.



Navigator Gold and PageMill are designed for the creation of individual pages, and they shield users from the complexity of HTML. FrontPage and SiteMill go a little further, helping to manage collections of pages, maintaining consistency through a site and checking link integrity.

There is also a growing number of special-purpose utilities to convert file formats to HTML from text, RTF and PostScript. You'll also find tools for creating Web pages in programs such as QuarkXPress; Adobe PageMaker, Illustrator and FrameMaker; Qualcomm Inc.'s Eudora; and Microsoft Excel. For users who simply want to make their existing desktop published documents available on the Web, Adobe Acrobat is worth a look.

7. Putting multimedia on the Web

Just as the combination of Mosaic with a little more bandwidth made image viewing on the Internet routine, the continuing evolution of client software (Navigator plug-ins, for example) and faster connections are making it possible to add sound and video.

There are two basic approaches: clips and streams. For applications that require high quality, clips, which are essentially large files,

See Sites, Page 30

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Sites

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are the way to go because they can be created at any level of resolution.

Though they can't compete with clips in terms of sound or image quality, streams transform the Internet into a broadcast medium. It may sound like bad shortwave, but for users who want to reach audiences on high-speed links or broadcast an event, streams are the way to go.

For now, Progressive Networks' RealAudio is the dominant player for streams, and to some extent for clips, too. "When the audio stuff first started there were probably 30 formats, but, like it or not, RealAudio won out for the moment, and now we give users a choice between RealAudio, .au and .WAV files," Tracewell said.

8. Creating new services

The Web isn't about static pages anymore — it's about interaction (see story, Page 32).

Large sites can be improved dramatically with search engines, and sites that attract a loyal following of users may benefit from discussion groups and mailing lists.

While transactions on the Web aren't that important yet, it may be worth studying the options.

"It's a no-brainer to get WebStar to work with SSL [Secure Sockets Layer], but for just doing credit cards, it may not be necessary," Shotton said. "Using a credit card number over the Net, even when it's unencrypted, is probably safer than using it in a mall.

"SSL is more compelling for privacy issues, such as medical records; for companies sending proprietary information between sites; and for things like stock trading, where you don't have recourse if something goes wrong," Shotton said.

9. Creating ties

The Web browser is emerging as a universal graphical user interface client for all legacy data systems. Web interfaces to the primary midrange and mainframe environments — such as CICS, SQL, Oracle, and Open Database Connectivity (ODBC) — allow rapid deployment of client-server applications, and they eliminate the need to develop custom client software.

That means internal databases, catalogs, inventory and shipping records can be made accessible with a mouse click. Federal Express Corp., for example, lets customers track package delivery at its Web site.

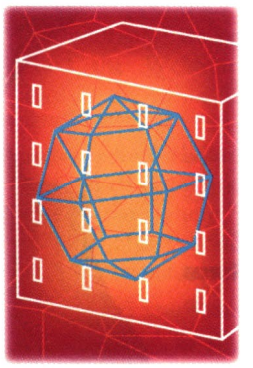
"We are using the Web to deliver information within our company, and the Web gives everyone, whether a Mac, PC or Unix user, access to the system," said Steve Holden, a systems analyst with Science Applications International Corp., or SAIC, a research and engineering company in San Diego. "People can use whatever client they want, and from a security standpoint, the Mac ensures that there are no hacks or break-ins. The security is a real win and the reason why we don't use a Unix server."

New tools to help integrate Web sites with SQL databases are becoming widely available. "There are some very good interfaces to SQL databases," Shotton said. "EveryWare did the Tango product for the Butler database, but it now talks to any ODBC-compliant database."

10. Building intranets

Some of the biggest payoffs from Web technology arise from internal company use. Intranet design has its own set of considerations. "After the first page, it's usually better to lay off the fancy graphics for internal sites," Tracewell said. "Remember that some employees, especially salespeople, are going to be accessing the site from out on the road or from home — you can't assume they are on the company backbone."

There is usually some overlap between information on public and internal Web servers. To set different permissions, Mokotoff and his colleagues, for example, have elected to run multiple copies of WebStar. "Setting different privileges is a problem, so what we have is the publicly accessible Web stuff in one folder and intranet materials in another."



Intranets may one day replace a range of groupware programs now on the market. "Web-based intranets are a competitor to Lotus Notes, and it is easier to get them to work," Shotton said.

"They are not quite as sexy or integrated, but you don't need 10 programmers to create something useful." □

GUEST EDITORIAL CONNIE GUGLIELMO

Mu shu chicken, no MSG

I don't remember the exact wording of a recent "Doonesbury" cartoon strip, but I do remember it went something like this: Poor Mike Doonesbury is in a frantic rush to get a Web site up and running within 24 hours (his boss's idea). After asking his daughter to explain what the World-Wide Web is, he spends all night working and finally gets a site going. Just as the groggy Doonesbury is leaving to go home and sleep, a coworker notes that Doonesbury has posted, as content, the complete menu for the local Chinese restaurant. Doonesbury's reply was something to the effect, "I'll work on the content later."

A few things struck me after reading that cartoon. First, like it or not, for better or worse, Web sites are the "in" place to be, be seen and be creative these days. Everyone, from corporations to kids, is rushing to carve a little niche on the Web, optimistic that millions of Internet travelers will stop by for a visit.

And with more and more companies offering do-it-yourself, easy-to-use Web-publishing tools, it's no wonder that the number of Web sites is growing exponentially overnight. Not long ago people just gave you their phone number; then it was their fax; then their e-mail address. Now you can't escape until they've told you to check out their own site at, pencils ready, slash-slash-www-dot-something-slash-somewhere-dot-whatever-slash.

In part, it's like the bad memories some of us hold of the early days of desktop publishing — when anyone with a Mac, a laser printer and copy of PageMaker could and did become a newsletter publisher, and we were inundated with ugly, uninformative laser printed output with lots of different fonts. The problem today is that we poor Web surfers, eager to explore this glorious new universe of information, are finding a lot of nothing — scads of menus for Chinese restaurants but not much more.

That's not to say that there aren't any great Web sites out there. Salon, the literary on-line "magazine" (see Page 36), is doing a lot of things right, including a streamlined design and provocative content that appeals to its target audience. A friend of mine is ecstatic about the niche publishing phenomenon; she searches real estate company sites looking for a new home.

Used to be, people just gave you their phone number; now it's their URL.

As a reporter, I find it extremely useful to visit a corporate Web site and download product, technical and pricing information without having to wait for someone in public relations to fax me information that I will have to re-key into my computer anyway.

Setting up a Web site doesn't make you a successful information provider. Having a few graphics, some sounds and a few buttons doesn't make you a hit with readers; stick with paper if you don't understand that designing for the screen is different than any other communication you may have created before and that Web surfers are not people with a lot of free time and bandwidth on their hands.

Creating and maintaining a Web site is a complicated technical affair and an *interactive* Web site is even more so. The technology is evolving; not everyone is operating at the same speed or using the same browser. Supporting a site demands a sophisticated and dedicated staff. It's a simple truth that Web publishing requires a long-term commitment to the site and your potential readers, who won't bother to make the trip again if you haven't impressed them on their first outing.

Just as we learned with desktop publishing, there are basic rules essential to effectively conveying information. They're not hard to learn. Have a purpose, know your audience, set high design standards and add new content often. Don't become a Web publisher just so you can say you're one. If everyone follows these rules, the Web will be more than just a place to find fast food. □

Connie Guglielmo is a MacWEEK contributing editor.

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And then, there's the fact that Macintosh brand loyalty is the highest of any PC in the world: 90% of Macintosh customers buy a Mac the next time around. Which leads people like Andrew Laham, MIS Director at the law firm Fleming, Hovenkamp & Grayson, to say, **"***There would be a major crisis if we had to do without Macs. In fact, there would be an open revolt.***"** Indeed, if the mail we've received lately is any indication, more than a few CFOs out there would revolt, too, if their companies didn't use Macintosh computers.

"*NASA saved $800,000 a year on maintenance alone when we replaced their legacy system with a Macintosh system,***"** says Steve Monteith, a member of the Research Triangle Institute TechTracS Team.

And if you replace a Windows system with a Mac? According to a recent study by the Gartner Group, technical support costs for Macintosh tend to be 25% lower than support costs for Windows.** Even *PC World* magazine ranked Apple as one of the best for reliability and service among all makers of personal computers.

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As they say, you can't simply rest on your laurels. So what's next? Let's start with Copland, our upcoming operating system.† Copland won't just change the look of the Macintosh desktop; it will incorporate an entirely new technology called OpenDoc® that will change the way you think about computers. (Sound like hype? Check out *InfoWorld*—they named OpenDoc the winner of the 1995 Landmark Technology Award.)

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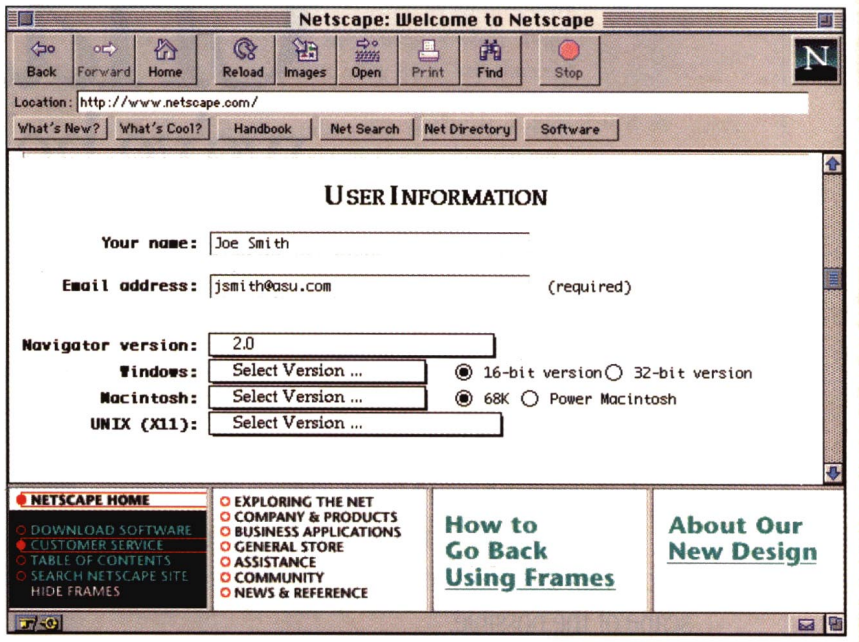
Good interactive sites take time, hard work

By Michael Miley

As your Web site grows, you'll most likely be adding multimedia and interactive components, two broad streams of Web page production that often get lumped together but are really like the right- and left-brained components of your Web presentation. The right-brained multimedia you add — images, animation, video, sound and 3-D virtual reality — give the pizazz to your page that will attract new visitors, but it isn't the whole story.

Equally important, though less dazzling, is the left-brained interactivity you build into your site, spanning the simplest links to the most sophisticated interfaces. Interactive buttons, forms, frames, searches and database links define how readers will navigate, query, respond to or order products from your pages. Good interactivity, plus reader incentive to use it, helps build a relationship with your visitors, thus ensuring your success over time.

Here's a basic checklist of issues to consider along the way. More importantly, you'll find a road map to some key sites we recommend visiting to help figure it all out.



The Feedback Form on Netscape's Web site is a typical interactive form, using text input fields, pull-down menus and radio buttons.

What's interactive?

Building interactivity means adding a variety of communication elements onto your Web pages, including local and remote URLs (uniform resource locators) and e-mail links, as well as forms of all kinds. The key interactive interface components are built of links, bullet lists, tables, submit and radio buttons, check boxes, text-input fields, pull-down menus, frames, and dynamic documents.

You can build these elements in your pages using a combination of HTML coding, CGI (Common Gateway Interface) scripts and programs. CGI scripts and programs extend the interactivity of basic HTML pages by linking your Web server to external applications (http://hoohoo.ncsa.uiuc.edu/cgi/intro.html).

Aside from enabling multimedia content, CGIs can execute such things as forms for passwords, registration and voting; taking surveys or user profiles and address books; or random URL pickers. The guest-book concept for logging reader responses can be extended to "graffiti walls" to allow visitors to post notes and graphics, to list servers for special-interest groups, or to full-fledged Web-based conference systems or BBSes. (Conferencing on the Web: http://freenet.msp.mn.us/people/drwool/webconf.html).

You can also build search forms that tie into AppleSearch archives, or create forms for ordering products on-line via databases, though you're at the cutting edge here since you'll require background credit validation and security features for protecting credit card ID numbers.

One company, StarNine Technologies Inc., provides a Security and Commerce Toolkit for WebStar that ties the server into the First Virtual Internet Payment System (http://www.fv.com/).

A common interactive feature is the image map, where the x-y coordinates of an image activate pages based on where the mouse is clicked. Some guided tours utilize image maps, as well as many Web-based games. Since each Web server has its own ways of implementing image files, you'll need to bone up on its specific requirements for implementing image maps; but map editors such as Thomas Boutell's Mapedit for Windows and X Window or Roland Smith's WebMap for the Macintosh, which lets you create map files in both CERN, the European Laboratory for Particle Physics, or National Center for Supercomputing Applications format, are designed to help (http://hyperarchive.lcs.mit.edu/HyperArchive/Archive/text/html/web-map-101.hqx).

How do I design an interactive page?

A good place to start if you're thinking about Web page design and development is Bob Allison's Webmasters page, where you'll get a good overview of all the issues having to do with designing interactive pages (http://miso.wwa.com/~boba/masters1.html).

For a Web-page style guide, spend time studying Patrick J. Lynch's Web Style Manual (http://info.med.yale.edu/caim/StyleManual_Top.HTML).

And for more technical background and tools, visit the Web Developer's Virtual Library (http://www.stars.com/Vlib/) where you'll find an immense number of links covering general Internet topics, as well as more technical materials on both server and client-side Web programming issues.

Who's your audience?

Before actually building interactivity into your site, plan ahead and set your goals. Enterprisewide intranet sites within a business usually serve a very different purpose than those served up to the public at large and will determine the features and content of your pages. Even Internet Web sites vary between those for a specific audience (for example, the clients of a pre-press house) and those for the general public. Pages targeted for the broadest audience and to be accessed over modems should be designed and tested for a variety of browsers (including text-based ones such as Lynx from The University of Kansas); viewed over DOS, Windows, Mac and Unix machines; and checked with an HTML validator.

Sites that use HTML 3.0 additions or

See Interactive, Page 34

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Users looking to post product and company information on their Web sites should browse InterCon's site. The company offers a Mac-based commercial Web server.

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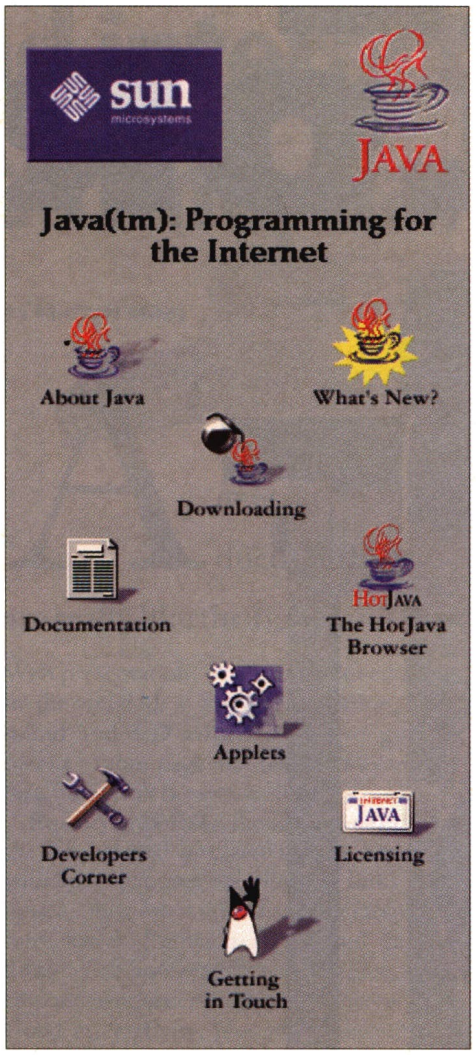


Using its own Java language for constructing an interactive Web site, Sun Microsystems has put together a site that features animations and real-time interactions in addition to text-based information.

Interactive

From Page 32

Netscape Communications Corp.'s Navigator 2.0 extensions will restrict some potential readers unless you specifically build alternative views for less-aware browsers or provide links to the proper sites to download the needed helpers for viewing. This will eventually extend to a variety of plug-ins, such as Adobe Systems Inc.'s Acrobat Portable Document Format (PDF), Macromedia Inc.'s ShockWave for Director, or DeltaPoint Inc.'s WebAnimator; to pages written in Sun Microsystems Inc.'s Java language (for animations and real-time interactions); and to virtual reality 3-D subsites written in Virtual Reality Modeling Language (VRML).

Make a point of visiting the Netscape and Adobe sites for details and for download links (http://www.netscape.com/ and http://w1000.mv.us.adobe.com/).

Also be sure to check out the Java and VRML home sites (http://java.sun.com/ and http://vrml.wired.com/).

What's your server?

Since CGI scripting is the most common way to add interactive forms and the like to your pages, it's vital to know up front what Web server you'll be using, both for reasons of performance and capability.

For starters, Gopher and FTP servers don't allow CGI scripts, so you'll need a true Web server. Additionally, if you're using an Internet service provider to serve up your site, you'll have to work with it to get the site going (probably for a fee), and certain restrictions may apply to using CGI scripts.

If you're serving up the site yourself, you also have to decide if you're going to run your server on a Windows, Unix or Mac machine. Though a Mac may be easier to maintain for a Mac-savvy Webmaster, the lack of preemptive multitasking in the Mac OS may force some larger sites to a Unix solution.

CGI scripts require CPU time and memory during execution, and too many scripts could crash your Mac server under heavier user loads. Nonetheless, if you're not Unix-savvy, it's the only way to go for Mac users, and Apple's new servers promise greater performance than before. You'll find information about Apple Internet Server Solutions 2.0 at http://www.apple.com/. The servers come bundled with $4,000 worth of software, including a suite of CGIs.

There are several Mac-based commercial Web servers. The most commonly used are StarNine's WebStar (http://www.starnine.com/) and InterCon Systems Corp.'s InterServer Publisher (http://www.intercon.com/).

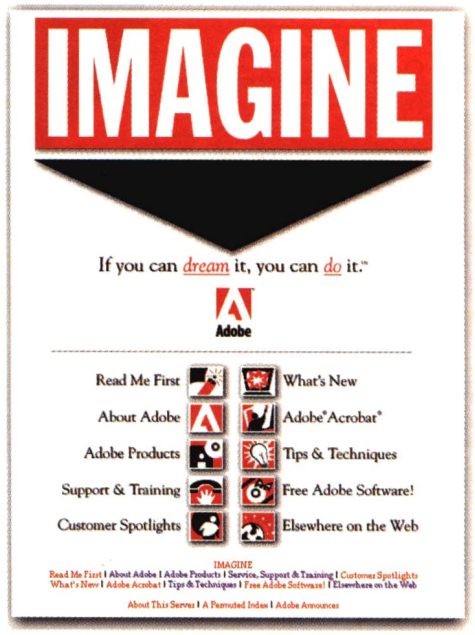
WebStar uses Apple events to communicate with CGI applications for handling maps, forms, text and more. The CGIs can be written in any language, including C, C++, AppleScript, MacPerl and HyperCard.

MDG Computer Services Inc. sells an ACI US Inc. 4th Dimension-based server called Web Server 4D that lets you sidestep CGIs, since all your interactivity is accomplished inside the 4D database (http://www.mdg.com/).

What's in your tool kit?

Since interactivity is built primarily — but not solely — at the server site, tools to extend the functionality of a Web server via CGI scripts and programs should be added to your tool kit of HTML editors, converters, batch processors, link checkers, server maintenance tools and the like.

Freeware, shareware and commercial CGI programs and shells abound, written in a variety of scripting and compiled languages. Check ComVista Inc.'s Macintosh WWW Resource Directory at http://www.comvista.com/net/www/wwwdirectory.html for a listing of programs for map processing, e-mail and fax, active pages, and database interfaces; for links to shells written in both scripting and compiled languages such as AppleScript, Frontier, C++, MacPerl, Prograph, HyperCard and others; and for tutorials on writing CGI scripts.



Adobe treats Web surfers to a clean interface, behind which users can easily find company and product information.

Letting users add content to your server requires extensions, and Maxum Development Corp.'s NetCloak and NetForms CGIs allow just that (http://www.maxum.com/homepage.html).

For tying your pages into databases, try Russell Owen's FileMaker Pro CGI (http://rowen.astro.washington.edu), a freeware tool for forms-driven access to Claris Corp.'s FileMaker Pro.

Also worth a visit is EveryWare Development Corp.'s site for the lowdown on Tango (http://www.everyware.com), its full-featured visual development tool that integrates SQL databases, including EveryWare's Butler, with your Web server.

Then surf over to Foresight Technology Inc.'s site (http://www.fsti.com/weblink.html) for info on NetLink/4D, an external for 4th Dimension that gives you asynchronous CGI access to 4D databases via WebStar.

What else is there?

In three words: a whole lot. As Allison advises at his Webmasters site: Think of building interactivity not just as a technical issue but as a public relations one as well. Build reciprocal links to like-minded sites. Respond to your visitors so they don't feel neglected. Submit your site to Web directories, such as Yahoo!, Lycos and InfoSeek. Promote your Web site on and off the Internet. Post politic notices in appropriate Usenet groups. Alert the trade and consumer press. And tout your site in all your corporate literature.

The result of all this effort will be a living site — and not just another flashy bug that quivers for a time in the Web before it's swallowed up by time and neglect. □

EveryWare Development's site provides everything users need to know about Tango, the company's full-featured visual development tool that integrates SQL databases, including EveryWare's Butler, with a Web server.

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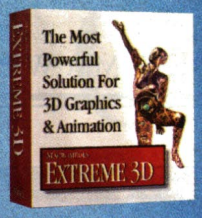

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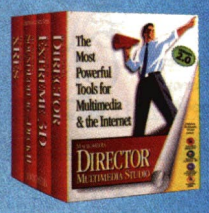

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CASE STUDY

Style, simplicity give Salon reader appeal

By Mitzi Waltz

There's a downside to being trendy, and San Francisco-based Salon, one of the Internet's most elegant new "magazines," is finding out the hard way. Thanks to a partnership with Apple, Salon, which offers a medley of stories and commentary about literature, the arts and politics doesn't have to worry too much about server capacity. Salon's three Apple Internet Servers are located and maintained at Apple's "server farm" in Napa, Calif., according to Dan Shafer, director of technology and senior Webmaster for Salon.

For Salon — which has seen its site explode in popularity after only a few weeks on-line — the challenge is to improve performance. Shafer is working hard to do that through software and by keeping key design considerations in mind.

Maxing out

The two Workgroup Server 6150s that power the magazine run WebStar from StarNine Technologies Inc., Lutz Weimann's freeware ImageMap and some CGIs (Common Gateway Interfaces) that were created with UserLand Frontier.

"When I came on, I took a look at the configuration of WebStar and saw that it had not really been set up for optimal performance," Shafer said. "I did a series of experiments to decide what should be done, even running a stand-alone Web server on our office Ethernet LAN to make sure my choices would work. Then I changed some settings in WebStar — and got about a 40 percent improvement in throughput."

There are still "spike" use periods that cause the servers to run slower than Shafer would like, of course, but additional memory, lines or servers are expensive propositions and hard to justify financially if the problem is confined to brief periods of high volume.

Easy on the eye

Beyond optimizing his server software and keeping an eye on weekly usage reports that will eventually determine when additional hardware should be brought on-line, Shafer works closely with the magazine's design team to avoid delays. "We're not doing any heavy CGI stuff yet," he said. "We just have a few scripts, like a survey that we're working on. One of the things we've tried to do from the beginning is realize that many of our readers have 14.4-[Kbps]-level access, so we've tried to limit the size of any downloads to 40 to 60 Kbytes. Although the site is graphically attractive — artistic, even — that's done in ways that don't tax the user's system."

Salon's spare look is suspiciously reminiscent of The New Yorker, and is both processor-friendly and easy on the eye. In fact, placed as it is in a Web of sites plagued with ill-conceived animations and obnoxiously amateurish neon graphics, its simplicity makes it stand out.

It's also, as Shafer noted, about more than art. "Black-and-white line drawings are one of the things we do" to make pages load faster, he said.

Patterns, the cause of many an on-line publication's headache-inducing interface, are not found here. "Patterns cause too many problems across Web browsers and people's eyesight," Shafer said. "We do use color backgrounds — that's just one HTML command. We've also resisted things like animation, although there was a tiny, subtle one in our Valentine's Day issue."

Besides, undue pizzazz wouldn't fit Salon's image. "What we want to bring to the world is taste and quality, the same sensibility as you get in a print magazine of this type," Shafer said. "We're not well-served by bringing a lot of glitz and noise, even if systems were well-equipped for browsing that type of content."

Growth-conscious

Shafer uses Kitchen Sink Software Inc.'s ServerStat to run specialized reports for the publisher and editorial staff each week, as well as to keep himself informed about which operations could be causing the servers undue stress.

This instant editorial feedback is already shaping the magazine. "The reports tell in broad, aggregate terms what kinds of features and what writers are drawing the most interest on the site," he said

One lesson already learned is that the print-world idea of putting out a new issue at regular intervals no longer applies. "Between 'regular' issues, we do one or two major new pieces, and cycle two or three out," Shafer said. "We have to get to the place where it's issueless and every day there's something new."

Table Talk

One of the busiest areas of Salon, Table Talk, runs on the magazine's Apple Internet Server 8150. "That's our conversation pit," Shafer said. "Conversations were a very important part of our mission statement — we wanted to build a community of readers who were interested in the same subjects our editors were."

Salon started out with a Butler SQL database from EveryWare Development Corp. with a Tango CGI running on top of WebStar; it didn't work, especially as usage volume increased. Its new solution is based on Web Crossing from San Francisco-based Lundeen & Associates, which Shafer said brings speed, scalability and customizability to BBS-style threaded conversations in a Web environment. "I've not yet had one reader complain or bug or crash, and there was not a single day with the old system where we didn't have all of that," he said.

What's more, Web Crossing provides the sysop with more control over how things look, timeouts and what users see at one time.

Shafer said Table Talk has become the talk of the Web: More than 6,000 users have registered, and each week 200 to 500 more join the party.

Salon has been on-line only since February. Although it's had little publicity (Shafer admitted he hadn't even submitted its URL to popular search engines yet), it is already getting about 45,500 hits per week from between 10,000 and 17,500 individuals. With a publicity campaign about to launch, its Web-site crew is sitting tight, hoping that scalable software and limitations-conscious design will help it weather the expected stampede of readers.

Salon can be reached at http://www.salon1999.com. □

ED CALDWELL

Dan Shafer, director of technology and senior Webmaster for Salon, has worked hard to improve performance at the interactive magazine.

Described as the Internet's most elegant new magazine, San Francisco-based Salon offers a mix of stories and commentary about literature, the arts and politics. Says Webmaster Dan Shafer, "What we want to bring to the world is taste and quality."

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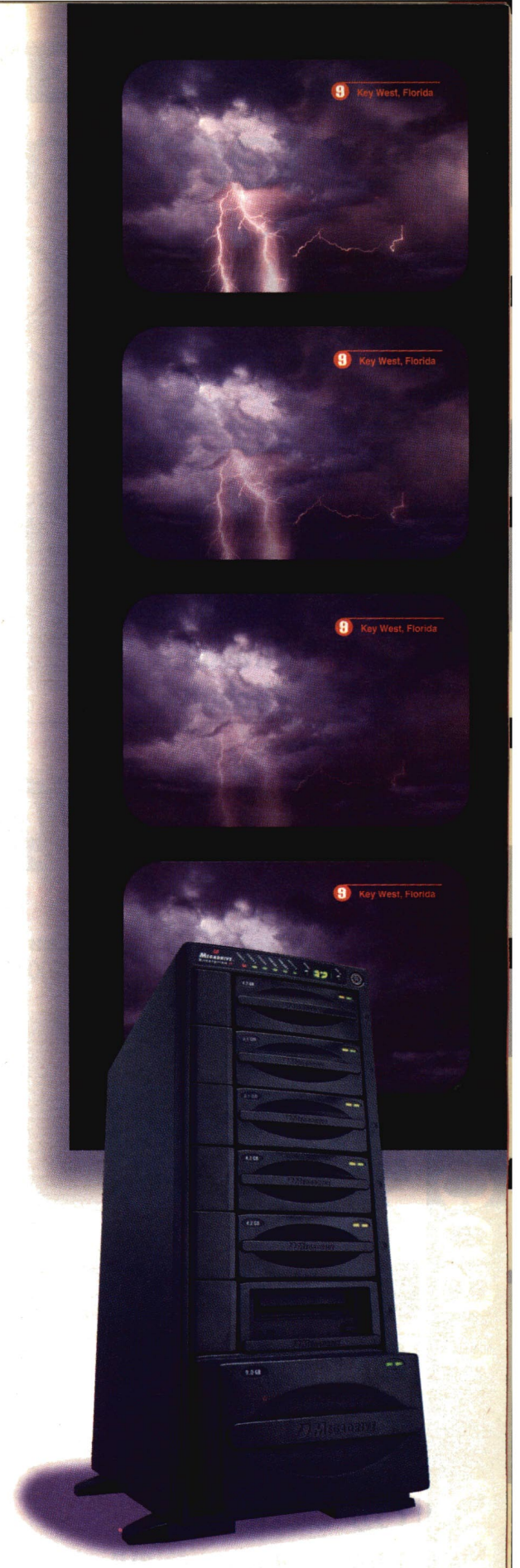

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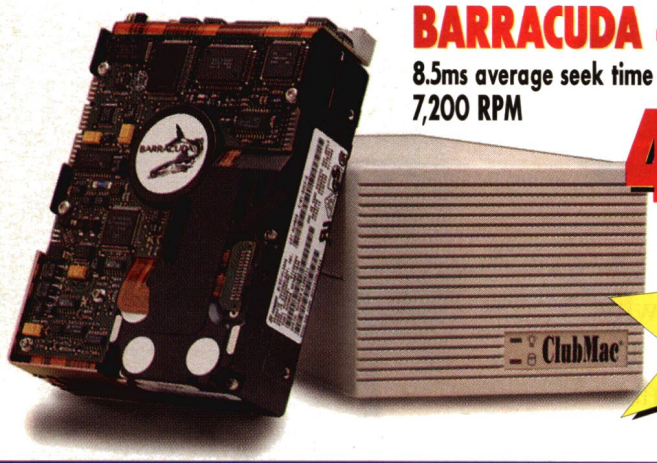

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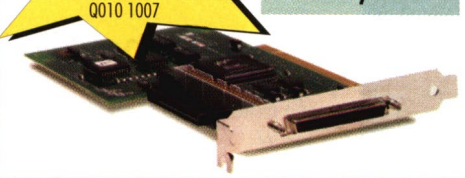

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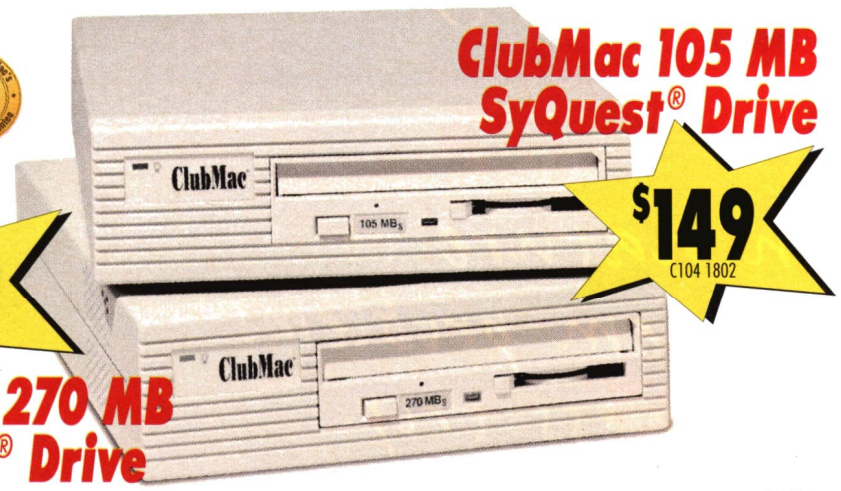

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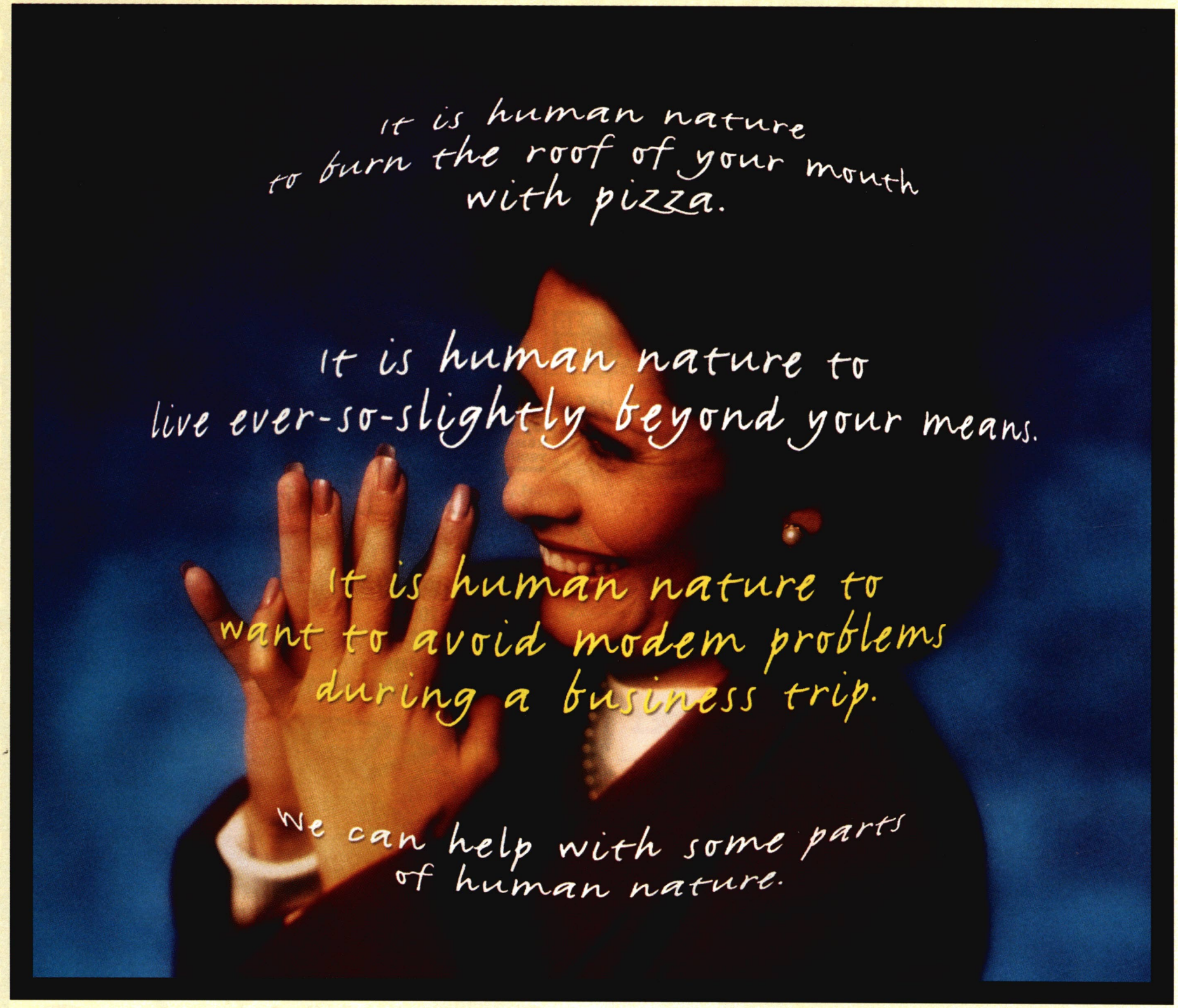
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INSIDE MACBENCH

For a detailed explanation about the MacBench graphics card tests, see Page 46.

PCI cards provide fast acceleration for QuickDraw

Overall value:
Imagine128 ♦♦♦♦
MGA Millennium ♦♦♦

One of the best things about the release of the PCI-based Power Macs last summer is that it has encouraged a number of card vendors from the Intel-standard world to develop Mac products. Two long-time players in the personal computer market, Number Nine Visual Technology Corp. and Matrox Electronic Systems Ltd., have recently released PCI-based graphics accelerators, and because they're new names to Mac users, we were curious to see how their cards stacked up against the competition.

Number Nine's Imagine128 is a speedy, full-featured and trouble-free product that we recommend to anyone wanting to run 24-bit video at high resolutions. Of the current available crop, this is now the fastest PCI card. Matrox's MGA Millennium is the first graphics accelerator for the Mac that includes QuickDraw acceleration as well as hardware for speeding 3-D rendering through Apple's QuickDraw 3D. The card is fast and functional for 2-D work but leaves a lot to be desired for 3-D graphics.

Imagine there's no bottleneck

The Imagine128, which is available in a $699 (estimated street price) 4-Mbyte configuration and a $1,099 8-Mbyte configuration, is only the second PCI video card we've seen that supports 24-bit color at resolutions up to 1,600 by 1,200 pixels; the other is Radius Inc.'s ThunderColor 30/1600 (see 12.11.95, Page 47).

In tests conducted on a Power Mac 9500/132, the Imagine128 scored resoundingly better in the MacBench 3.0 Graphics and Publishing Graphics mixes than all its competition, thanks mainly to a just-released software update that greatly improves the card's performance. (This update is being mailed to all registered owners and is also available on the company's FTP site.) We also conducted straightforward scrolling tests in Adobe Photoshop and Microsoft Word and Excel. The Imagine128 again proved to be significantly faster than the other cards we looked at — in most cases, more than 10 seconds faster (see benchmarks, next page).

Although the card now ranks as the fastest PCI video card we've tested, we should state that any set of benchmarks is open to interpretation and that real-world performance in one application may not be a good predictor of performance in another (see story, Page 46). Those who expect to see a huge speed increase on their Macs after adding an accelerated video card will almost certainly be disappointed. The Imagine128 will speed your Mac's graphics performance, to be sure, but in day-to-day usage the difference will sometimes be a subtle one; you won't always see an obvious, overwhelming improvement.

When we tested the card at its maximum resolution of 1,600 by 1,200 pixels at 24-bit color, we noticed that it ran slightly slower than it did at a resolution of 1,152 by 870 pixels. This is different from the behavior we noticed in the Radius Thunder 30, which was clearly optimized for the higher resolution. The actual speed differences were very small — we mention it only as an indication of the differing philosophies embodied in the two cards. The Imagine128 is still plenty fast when it's displaying 1,600 by 1,200 pixels, and any loss in scrolling performance is offset by the fact that you're viewing almost twice as many pixels than at 1,152 by 870.

One other difference between the Radius card and the Imagine128 is that the Radius card uses a 10-bit DAC (digital-to-analog converter) while the Imagine128 uses an eight-bit DAC. This is significant only if you're using monitor calibration to set a white point different from the monitor's native color temperature, and then only if the calibrator you're using works by adjusting values in the video look-up table on the card rather than by controlling the monitor voltages directly, as does Radius' PressView SR/ProSense combination.

Elegant software

The software that accompanies the Imagine128 is quite elegant. A system extension turns on the acceleration, and a control panel provides all the controls you'd expect from a state-of-the-art video card. You can switch resolution and bit depth on the fly, use four levels of hardware zoom and pan, and automatically dim the screen after the system has been idle for a user-defined period.

Two other features are unique to the Imagine card. Font caching dedicates some of the RAM on the card to displaying type. The effect of this on real-world performance is subtle but measurable. The other feature is more gee-whiz: You can drag windows and display their contents while you drag, rather than dragging a ghost outline. (When you do this, you also erase anything underneath the window as long as the mouse button remains depressed.) The feature doesn't seem to extract any performance penalty. We can't say we find it incredibly useful, but if you like such things (we remember early adopters of the NeXT Computer Inc. machine positively vibrating with glee over this very feature) you'll find it's been well-implemented by Number Nine.

Approaching the Millennium

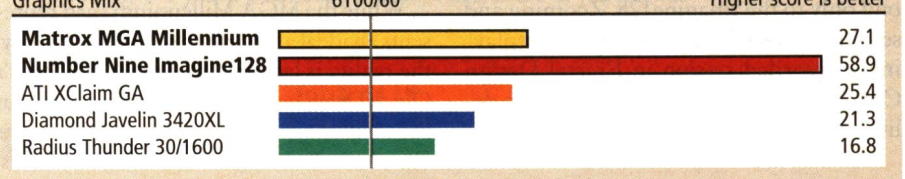
Matrox's MGA Millennium card is aimed at graphic artists and publishers who are likely to be making their first forays into 3-D design. The card comes in two configurations: a 4-Mbyte $649 version capable of driving 19-inch monitors at resolutions up to 1,152 by 870 pixels at 24-bit color, and a

See Graphics, next page

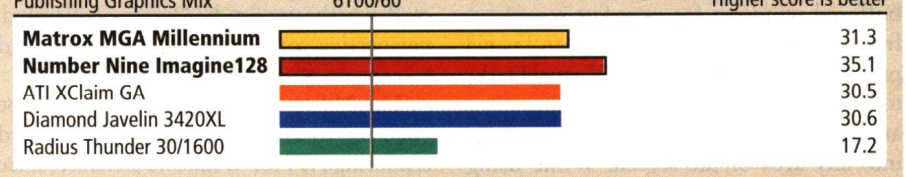
PCI graphics accelerator cards

The Number Nine Imagine128 and Matrox MGA Millennium proved to be the two fastest graphics accelerators in our tests. The Number Nine card is the clear victor here, doubling the score of the competition in the Graphics Mix.

Graphics speed typical of general-purpose software



Graphics speed typical of QuarkXPress and Adobe Photoshop



Test configuration: All tests were performed on a Power Mac 9500/132 with 128 Mbytes of RAM. Monitor resolution was set to 1,152 by 870 pixels at 24 bits. AppleTalk was off, Virtual Memory was set to 1 Mbyte, and a standard extension set was on. The Matrox, Number Nine and Radius cards had 8 Mbytes of VRAM; the Diamond and ATI cards had 4 Mbytes of VRAM.

*MacBench's score compares speed to a Power Mac 6100/60, which receives a 10.

QuickDraw 3D satisfaction so far is not-so-immediate

By Sean Wagstaff

For high-end users, the crux of Apple's QuickDraw 3D technology is plug-and-play hardware acceleration. Here, Version 1.0 has so far proved a disappointment. Fortunately, a fix is in the works.

When we tested the two QuickDraw 3-D accelerator boards currently available, Apple's QuickDraw 3D Accelerator Card (see 11.13.95, Page 1) and Matrox Electronic Systems Ltd.'s MGA Millennium (see story above), we found them effective with very small models, where hardware is hardly called for. But throw a good-sized flying logo or spaceship at them and they appear to cease accelerating altogether: Rendering speed is quickly reduced to software speeds. In real-world situations — rendering production-oriented scenes — the boards seem to be practically useless or even worse. The Matrox card actually causes a dramatic slowdown in Microspot USA Inc.'s 3D World.

Apple's QuickDraw 3D Accelerator card can render large objects with trans-

See QuickDraw, Page 44

Graphics

From previous page

$999 8-Mbyte version offering 24-bit color to 21-inch monitors at resolutions up to 1,440 by 1,080 pixels.

Video RAM will also dictate how much 3-D space users can hope to conquer with the card. With 4 Mbytes, 3-D rendering is accelerated at up to 832 by 624 pixels at 16-bit color, while users with 8 Mbytes of VRAM should see 3-D performance gains at 1,024 by 768 pixels in 24-bit color.

We found the speed of the MGA Millennium to be good, roughly on par with ATI Technologies Inc.'s XClaim GA card. On the MacBench Graphics and Publishing Graphics mixes the card came in second only to the Imagine128. Zooming and scrolling tests with Photoshop and replaying a recorded session in Fractal Design Corp.'s Painter all showed the board to deliver fast QuickDraw performance.

How refreshing

The additional RAM on the board provides buffered windows for very fast screen refresh rates. The Millennium's control panel provides two more features: a Virtual Desktop that is bigger than your actual monitor and Pixel Zoom, which can instantly zoom into any area of the screen. While using these features, screen refreshes are almost instantaneous and provide very smooth movement around the screen.

While the MGA Millennium is priced competitively with comparable graphics boards from other vendors, Matrox is hoping to differentiate its card with the included 3-D hardware, which relies on the company's own home-grown 3-D application-specific integrated circuits. With 3-D an important part of the modern graphics scene and Apple pushing hard to get Mac users rendering, this strategy makes sense.

To date the only other hardware accelerator available for QuickDraw 3D is Apple's own QuickDraw 3D Accelerator (see 11.13.95, Page 1). That board, however, lacks a QuickDraw frame buffer, so it can't drive a monitor. It simply accelerates the rendering of 3-D images on whatever monitors are currently in use.

While the MGA Millennium card represents an ideal all-purpose solution in theory, the reality is less than stunning. The card's QuickDraw acceleration is very good, but the Millennium most clearly shows its Windows-Intel roots in its 3-D features. The Millennium handles only polygon shading, in marked contrast to the Apple card, which supports hardware-accelerated, perspective-corrected texture mapping and transparency as well as polygon shading.

The Millennium's 3-D features may be good for users of Open GL, the standard rendering API for Windows software, since that API doesn't support texture mapping and transparency. But Open GL's capabilities are a generation behind QuickDraw 3D,

See Graphics, Page 46

MACWEEK REAL WORLD LABS

Scrolling tests

In scroll tests, Number Nine's Imagine128 card was the fastest of the PCI graphics accelerators. The Matrox card was mostly competitive but bogged down horrendously in the Word scroll test.

Scroll 131-page Microsoft Word file

Text scroll	Shorter is better	Seconds
Matrox MGA Millennium		159.9
Number Nine Imagine128		22.2
ATI XClaim GA		35.8
Diamond Javelin 3420XL		31.9
Radius Thunder 30/1600		33.6

Scroll 1.3-Mbyte Microsoft Excel file

Data scroll	Shorter is better	Seconds
Matrox MGA Millennium		81.5
Number Nine Imagine128		70.8
ATI XClaim GA		87.7
Diamond Javelin 3420XL		80.0
Radius Thunder 30/1600		81.1

Scroll 22.5-Mbyte Adobe Photoshop in CMYK

CMYK scroll	Shorter is better	Seconds
Matrox MGA Millennium		20.5
Number Nine Imagine128		13.4
ATI XClaim GA		25.9
Diamond Javelin 3420XL		21.4
Radius Thunder 30/1600		16.1

Test configuration: All tests were performed on a Power Mac 9500/132 with 128 Mbytes of RAM. Monitor resolution was set to 1,152 by 870 pixels at 24 bits. AppleTalk was off, Virtual Memory was set to 1 Mbyte, and a standard extension set was on. The Matrox, Number Nine and Radius cards had 8 Mbytes of VRAM; the Diamond and ATI cards had 4 Mbytes of VRAM.

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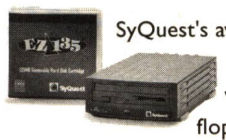

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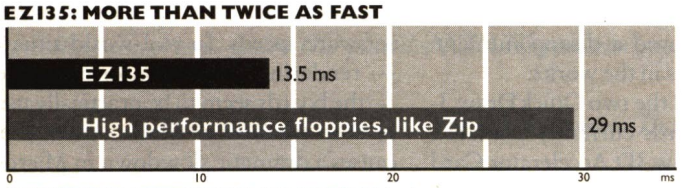

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QuickDraw

From Page 41

parency and textures almost as quickly as QuickDraw 3D in software alone can render, without these realistic surface qualities. But this is a gain in quality, not quantity.

With hardware acceleration, a slowdown in rendering is inevitable when a scene's complexity increases to the point where the CPU is so busy crunching geometry that the accelerator card is left waiting for something to render. But the cards we tested got stuck in the mud long before hardware rated at more than 100,000 rendered polygons per second should be close to bogging down. Something is pushing the performance curve far below its theoretical limit.

> QuickDraw 3D 1.1 will address performance issues with a new geometry type: Tri-mesh.

The blame is shared by the current Version 1.0.3 of QuickDraw 3D and the currently shipping crop of 3-D software, including Specular International Ltd.'s Infini-D 3.1 and Strata Inc.'s StudioPro 1.75+.

QuickDraw 3D offers two modes for rendering geometry in an application: Retained and Immediate. In Retained mode, 3-D data is stored in QuickDraw 3D's memory, and simple changes, such as a camera's point of view or a model's position in space, are passed along to QuickDraw 3D without affecting the rest of the data.

In Immediate mode, the entire 3-D database is passed to QuickDraw 3D every time a rendering needs to be updated. Even though Retained mode should be up to 10 times faster, Strata and Specular have both opted to use Immediate mode because of memory problems encountered with Retained mode.

The bigger picture

QuickDraw 3D is currently optimized for high-level geometries, such as NURBS (nonuniform rational B-splines) and efficient patches that describe 3-D shapes. Software that uses these types of geometry should also be highly efficient and fast using rendering hardware (since it can describe complex surfaces with a tiny amount of data). The current 3-D software vendors, however, have their own pre-existing geometry types that don't conform to Apple's. In some cases, these third-party geometries are more efficient because they offer different functionality than QuickDraw 3D's.

An application's geometries are decomposed by software to the lowest common denominator — usually polygons — before they're sent to QuickDraw 3D for rendering. This appears to be the performance bottleneck that's pushing down our hardware speed curve because the polygons have to be crunched in software before the 3-D hardware can do its thing. The discrepancy in geometry types also results in the ballooning of out-of-memory errors (which are particularly apparent in Retained mode) because an inefficient QuickDraw 3D description of a simple model may require up to 10 times as much RAM as the original. You can see this for yourself by dragging a simple model from your application to the Scrapbook while watching your system memory in the About This Macintosh dialog box. Apple, Strata and Specular have all independently confirmed these effects. Furthermore, it appears that some software vendors are actually keeping to their pre-QuickDraw 3D data sets alongside the QuickDraw 3D versions, effectively doubling the data overhead.

The tri-fix

According to Apple, QuickDraw 3D 1.1, due this spring, will partly address the problem by offering a new geometry type called Tri-mesh. This is a lightweight way to describe a complex surface that might otherwise have to be defined as a series of triangles. Immediate mode in QuickDraw 3D 1.1 should also be much better optimized, according to Apple.

Once developers implement Tri-Mesh support, users should see a dramatic improvement from both changes, with or without hardware acceleration. (Version 1.0.4, a minor bug fix available now, improves memory handling in low-memory situations.) Apple said users will see as much as a twentyfold increase in Immediate mode speeds (where it is needed most) and twofold improvement in Retained mode. As will be the case with any 3-D acceleration, users dealing with objects such as architectural models will not see as much of a performance boost as those using complex curved surfaces, since simple polygonal shapes won't get as much help from the Tri-mesh.

Users can also look forward to new hardware acceleration boards using 3-D chips from vendors, including 3DLabs Inc. and 3Dfx Interactive Inc. (So far, boards have been announced by ATI Technologies Inc., Daystar Digital Inc., Diamond Multimedia Inc., EA Research Inc., Newer Technology Inc., Number Nine Visual Technology Corp., YARC Systems Inc. and Radius Inc.) Some boards will be aimed primarily at games using the new RAVE (Rendering Acceleration Virtual Engine) implementation of QuickDraw 3D, while others will be targeted at high-end users and offer the gamut of QuickDraw 3D features. Meanwhile, users should anticipate much better performance from their existing 3-D hardware.

In the long term, 3-D artists will win if 3-D software and hardware companies work closely with Apple to make their applications, hardware and QuickDraw 3D work in sync at maximum speed. □

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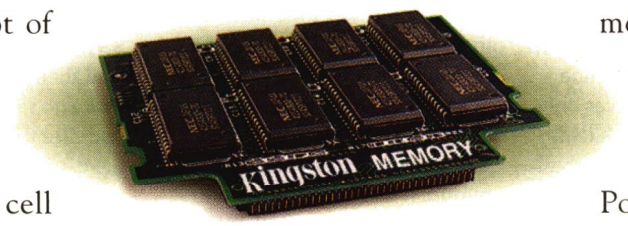

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Graphics

From Page 42

and we found the Millennium's features suffer in comparison to Apple's card. The Millennium's published specs for polygon shading are the same as for Apple's card — 120,000 Gouraud-shaded polygons per second. In practice, however, when comparing the Millennium's rendering times to QuickDraw 3D's software-only mode, its speeds were roughly equal, and in some cases worse. (We tested the card with the latest QuickDraw 3D-compatible versions of Strata Inc.'s Studio Pro, Specular International Ltd.'s Infini-D and even Apple's Gerbils test.)

In fact, Matrox was unable to offer a realistic test that succeeded in showing off the speed of the 3-D hardware. Our most reliable benchmark of QuickDraw 3D to date — using the Animate button to render a series of frames in Apple HW/Best mode in Infini-D — showed no speed improvement at all. In all fairness, part of this result is because of problems we found in QuickDraw 3D itself and in the current crop of QuickDraw 3D-enabled software (see story, Page 41).

Although the performance from Apple's accelerator is not as good as we hoped, it did offer measurable performance gains in our tests, particularly if you consider its added rendering features. In contrast, we found the Matrox card constraining in its lack of support for textures and transparency, and we've yet to see it actually speed up our 3-D work. Some important features enabled by QuickDraw 3D, such as constructive solid geometry — often referred to as Booleans — require hardware rendered transparency support.

Some programs appear to not even recognize the Matrox card as a compatible 3-D accelerator. We attempted to test the board with the QuickDraw 3D version of Reality Bytes Inc.'s Havoc game, which gets a remarkable boost from Apple's QuickDraw 3D Accelerator, but with the Millennium installed, Havoc displays a dialog box informing us that no QuickDraw 3D accelerator is present. Reality Bytes said that this is because Havoc primarily benefits from texture-map acceleration, something we'd expect from 3-D games in general.

Conclusions

Number Nine's Imagine128 is a reassuringly solid performer from a company new to the Mac market. It won't give you unprecedented fast screen redraws, but neither will any other video card. It will give you state-of-the-art speed at resolutions up to 1,600 by 1,200 pixels in 24-bit color, with all the features you could reasonably demand from a video card.

Matrox's MGA Millennium also provides very good performance as a QuickDraw accelerator on a wide spectrum of monitors, and graphics and publishing users will be happy with it. But, unfortunately, the card's major selling point, 3-D acceleration, is something of a bust; its apparent lack of compatibility with existing QuickDraw 3D applications sets a disturbing precedent. One of the chief promises of QuickDraw 3D is availability of plug-and-play acceleration, and we would expect the card's baseline features to be comparable to competing hardware. Those hoping to find a greatly accelerated and capable 3-D engine rolled into their speedy 2-D card may have to wait for the next Millennium.

Matrox Graphics Inc. of Montreal can be reached at (514) 969-6300 or (800) 361-1408; fax (514) 969-6363; http://www.matrox.com.

Number Nine Visual Technology Corp. of Lexington, Mass., can be reached at (617) 674-0009 or (800) 438-6463; fax (617) 674-2919; http://www.nine.com/. — *By Sean Wagstaff, Bruce Fraser and Jeff Green*

Graphics accelerator testing conundrums

Testing graphics accelerator cards is a tricky business. What these cards accelerate is QuickDraw, the set of routines (or calls) within the Mac operating system responsible for moving images, lines and text around in memory and drawing pixels on your monitor. Each drawing task performed by each Mac application uses a different mix of calls. To measure graphics-card performance, you must determine which calls in this profusion of possibilities make a difference.

Our primary testing tool is MacBench 3.0. MacBench has two types of graphics tests: mixes and subtests. The mixes are a composite measurement of a variety of graphics calls. The goal is to generate graphics calls of different types in the same proportions as they are generated when users perform common tasks in popular applications.

For the Graphics Mix, we profiled 13 applications that, according to data from Computer Intelligence InfoCorp of Santa Clara, Calif., were the most widely used Mac applications during the year prior to MacBench 3.0's development. For each application, we created a script of common tasks, such as opening and saving documents, editing text, and resizing graphics. As these tasks were performed, the QuickDraw calls generated by the applications were counted and weighed according to each application's relative market share. When you run the Graphics Mix, you are generating a mix of graphics calls that is statistically equivalent to performing the 13 application scripts.

The Publishing Graphics Mix is similar but is based solely on the two most important applications in the desktop publishing market: Adobe Photoshop 3.0.1 and QuarkXPress 3.31.

Mix masters

We've been able to uncover some interesting facts about graphics cards by using these two mixes. Some cards, notably ATI Technologies Inc.'s XClaim GA (which Apple offers bundled in the 9500/120) and the Matrox Electronic Systems Ltd. MGA Millennium do equally well on both mixes. In contrast, Multimedia Systems Inc.'s Diamond Javelin 3420XL makes a good showing on the Publishing Graphics Mix but turns in a weaker performance on the Graphics Mix.

Analyzing why cards perform as they do is the job of MacBench's subtests, which can reveal the specific QuickDraw calls responsible for the good, or bad, showing of a given card in the mix tests.

In the case of the Imagine128, for example, when we initially tested this card an examination of the horizontal and vertical line subtests showed that it was only about half as fast as the XClaim GA. These two tests figure prominently in the Publishing Graphics Mix because when we profiled QuarkXPress, the document's grid was turned on most of the time. At press time, Number Nine Visual Technology Corp. released new software for the card that significantly improved the speed on these calls — and thus greatly improved its score on this mix.

While lines weigh heavily in the Graphics Mix, text-drawing routines count even more. The Imagine128 did well on the text-drawing subtests because its internal text cache dramatically speeds text-drawing routines.

Waiting for my Mac

While MacBench's mixes can give you an overall idea of how a graphics card performs across a range of business or publishing tasks, it isn't smart enough — yet — to know which tasks qualify as "coffee-break triggers": tasks, such as scrolling, that take long enough to be irritating. So along with the MacBench tests, we looked at the cards' scrolling performance in Photoshop and Microsoft Word and Excel.

As it turns out, line- and text-drawing didn't weigh as heavily in Photoshop and Word scrolling as they did in the MacBench mixes. That's not surprising for Photoshop, but even in Word, a text-intensive application if ever there was one, it appears that QuickDraw's text-drawing routines aren't used that much during scrolling. Rather, PaintRect, CopyBits and FillRect do most of the work. In Photoshop, CopyBits, FillRect and ScrollRect are the heavies. Excel scrolling is a hybrid: It uses a lot of line and text drawing, but PaintRect and FrameRect are also major players (our test document had a number of bar charts in it). That's why we run both the MacBench mix results and the scrolling tests. They complement each other to provide a better overall picture of a card's performance.

For example, when we first tested the Imagine128, it was sluggish in the Excel scroll. Why? For the same reason this card originally did poorly on the Publishing Graphics Mix: weak line drawing. Just as a background grid in our XPress test document caused the Imagine128 to falter in the MacBench mix, Excel's spreadsheet grid slowed the card down when scrolling. In this case, there's a high correlation between the two tests. Once Number Nine fixed line drawing in its software update, its scores improved dramatically on both tests.

But now look at ATI and Number Nine's scores on Photoshop scrolling. Although ATI did well on both graphics mixes, it was sluggish on Photoshop scrolling, while the Number Nine card did quite well. Most likely, this was because of the excellent performance of the Number Nine card on a single call: ScrollRect. This call, in which the Imagine128 is two and a half times as fast as the XClaim GA, figures prominently in Photoshop scrolling.

Say what?

And then there are results that make no sense no matter how you slice them. Take, for example, the disastrously poor showing of the Matrox MGA Millennium on our Word scrolling test. Try as we might, we simply couldn't find a correlation between the card's speed on this test and its speed on any of the calls that predominate when this task is performed.

After much head scratching, we finally figured it out. In our test procedure, we zoom the Word document window to fill the monitor screen before scrolling. Apparently, one or two pixels spill off the edge of the screen when Word does this. During scrolling, this off-screen area was being updated along with what was visible on-screen. But Matrox's card wasn't accelerating this off-screen update. Hence, very slow scrolling. As soon as we pulled the edge of the window in a couple of pixels, things sped up tremendously.

As we investigated this effect further, we also discovered that some cards do much better than others when scrolling a document that is covered by Apple's Control Strip or by application palettes. It's basically the same problem as the off-screen update problem. A very different mix of QuickDraw calls is executed when part of the window is off-screen, or when a palette is covering part of a document, than when a more pristine scroll occurs. A call to Matrox confirmed this as a known (if somewhat secret) problem, for which the company is working on a fix.

There are also activities that many people assume are within the domain of graphics accelerators, but which in fact are not. Many common Photoshop tasks fall into this category: rotation, filters, resizing, RGB-to-CMYK conversion. While all of these tasks involve some QuickDraw activity as the results of the operations are displayed on the monitor, they are for the most part not graphics-intensive tasks at all. Rather, they are processor-intensive. QuickDraw has no routines for performing these functions. — By Henry Bortman

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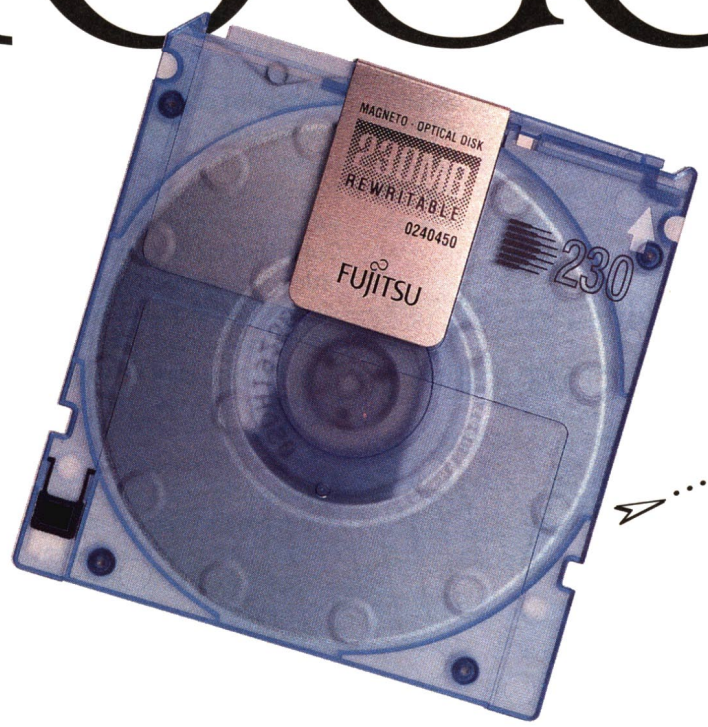

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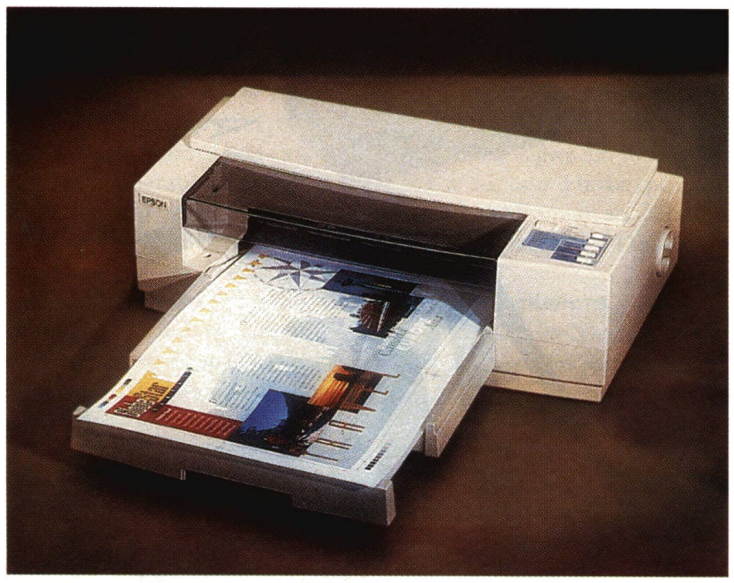
IN BRIEF

Stylus Pro XL

Gorgeous prints are worth the wait with Epson's inkjet

Overall value: ♦♦♦♦



Epson's Stylus Pro XL, a 720-dpi tabloid inkjet printer aimed at graphics professionals, is a poky performer, but its rich colors and phenomenal detail make it worth your time.

Epson America Inc. made an impact in the low-cost printer market 18 months ago with the Stylus Color, which offered 24-bit, 720-dpi printing (on coated stock) for less than $1,000. Since then, the company has expanded this line of printers not only at the low end of the market but also at the high end with the Stylus Pro XL, the first printer to offer full-bleed, tabloid-size color output for a less-than-$2,000 street price.

The Stylus Pro XL ($2,125 list price) is aimed directly at graphic arts professionals who want to create full-scale color comps quickly and easily. It can also be used in a limited sense as a proofing device, but it's not intended to replace Matchprints or dye-sublimation output, and Epson has been careful not to bill it as a one-stop graphic arts device.

The Pro XL uses Epson's microdot inkjet technology, which produces a dot 25 percent smaller than the printers in the Stylus Color line. This technology allows the Pro XL (and its letter-size cousin, the Stylus Pro) to print finer halftones and smoother gradations than earlier printers. A side benefit of this feature is that the Pro XL can print at 720 dpi on plain paper, unlike the Stylus Color printers, which require coated paper to print at the higher resolution.

Quick setup

Setting up the printer is a breeze. The black and CMY ink cartridges snap easily into place, and loading paper into the 100-sheet input tray is straightforward. To print to the Pro XL, you copy the serial-based driver to your System folder and select the printer from the Chooser. We had no problems printing from any application.

The printer can handle paper sizes up to 13 inches by 19 inches (SuperA3/B), providing a maximum print area of 12.76 inches by 18.33 inches. It can print at 720 dpi on plain paper, although the output looks much better on either the coated stock or the pricier glossy paper.

The printer also comes with Pantone-calibrated files for improved Pantone color-matching support from within major graphics applications such as Adobe Photoshop, PageMaker and Illustrator; Fractal Design Corp.'s Painter; QuarkXPress; and Macromedia FreeHand. There is a catch, however: You can use the supplied files to print good representations of Pantone colors on your Pro XL, but at separation time you'll have to recolor the graphics using the built-in Pantone Color tables supplied by the Pantone-licensed application. In practice, though, we found little difference between the Epson-specific and the application-specific Pantone charts.

Epson offers optional $199 LocalTalk and $399 Ethernet interface cards for the Pro XL. We did some limited testing with an Ethernet card and found that in general it improved printing speed.

Quality and performance

The Pro XL's output quality is superb: At 720 dpi, colors are rich and the detail is phenomenal. The quality drops a bit if you use paper with a high rag content, but it is still impressive. You can also print at 360 dpi, which is a bit faster and uses less ink.

> The Stylus Pro XL is aimed at graphic arts professionals who want to create full-scale color comps quickly and easily.

Overall, the quality of output from the Pro XL surpasses that of color inkjets from Apple and Hewlett-Packard Co.

The downside of the Pro XL is print speed. To print a full-color SuperA3-size page at 720 dpi can take from 25 minutes to an hour via the serial connection, depending on the complexity of the page. Most of the time our pages printed in half an hour, but printing from Photoshop was particularly slow. Printing on smaller paper sizes will, of course, take much less time, and monochrome text files will print at speeds comparable to other inkjets (up to 2 pages per minute).

Epson claims that the bottleneck is in the Mac's serial connection and that using the Ethernet card will drastically reduce print times, but if speed is your main concern, the Pro XL is not for you.

A problem endemic to liquid inkjets is the amount of ink you go through — one of the hidden costs of inkjet-printer ownership. The Pro XL, however, doesn't share this limitation. We've had printers, such as the Apple Color Stylewriter 2400, run out of ink after printing four or five photos on glossy stock, but the Pro XL printed more than 100 sheets of SuperA3 paper and a similar amount of letter-size paper without running out of ink. In the long run, we think this makes the cost of owning the Pro XL even more attractive.

PostScript connection

Epson is offering a $2,500 package that includes the Pro XL, an Ethernet card and PowerRIP, a PostScript Level 2-compatible software interpreter from Birmy Graphics Corp. Getting PowerRIP started involves a little bit more effort than printing to a device with PostScript on board, but it was relatively easy to use once we got it set up. You'll need at least 15 Mbytes of free RAM to print properly in the background using the Birmy RIP.

PowerRIP cut most of our print times significantly — a tabloid-size PageMaker document that printed in 35 minutes going straight through the Epson driver took only 18 minutes with the Birmy driver. The exception was Photoshop files, which printed in about the same time with either driver. (They also looked better with Epson's native driver and screening than with PowerRIP.)

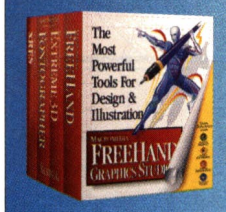
Conclusions

It's not going to replace service bureaus and the high-end printers on the market, but the Stylus Pro XL is a very good printer for its chosen niche. For an estimated street price of $1,800, it's a great way for graphic artists and designers to get stunning large-format output to use for comps and proofs.

The printer won't win any speed contests, but the output quality is worth the wait in most cases, and if you have to have PostScript, Birmy's PowerRIP is a workmanlike option. If you don't need the tabloid-size output, the lower-priced Stylus Pro is an even better buy, offering the same technology at an estimated street price of $600.

Epson America Inc. of Torrance, Calif., can be reached at (310) 782-0770 or (800) 289-3776, Ext. 3000; fax (310) 782-5220; http://www.epson.com. — *By Rick LePage*

In Brief continues on Page 50



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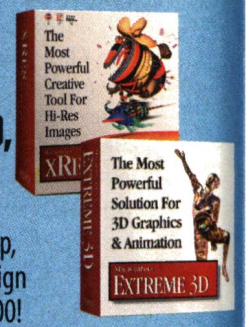

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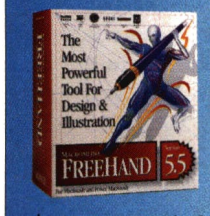

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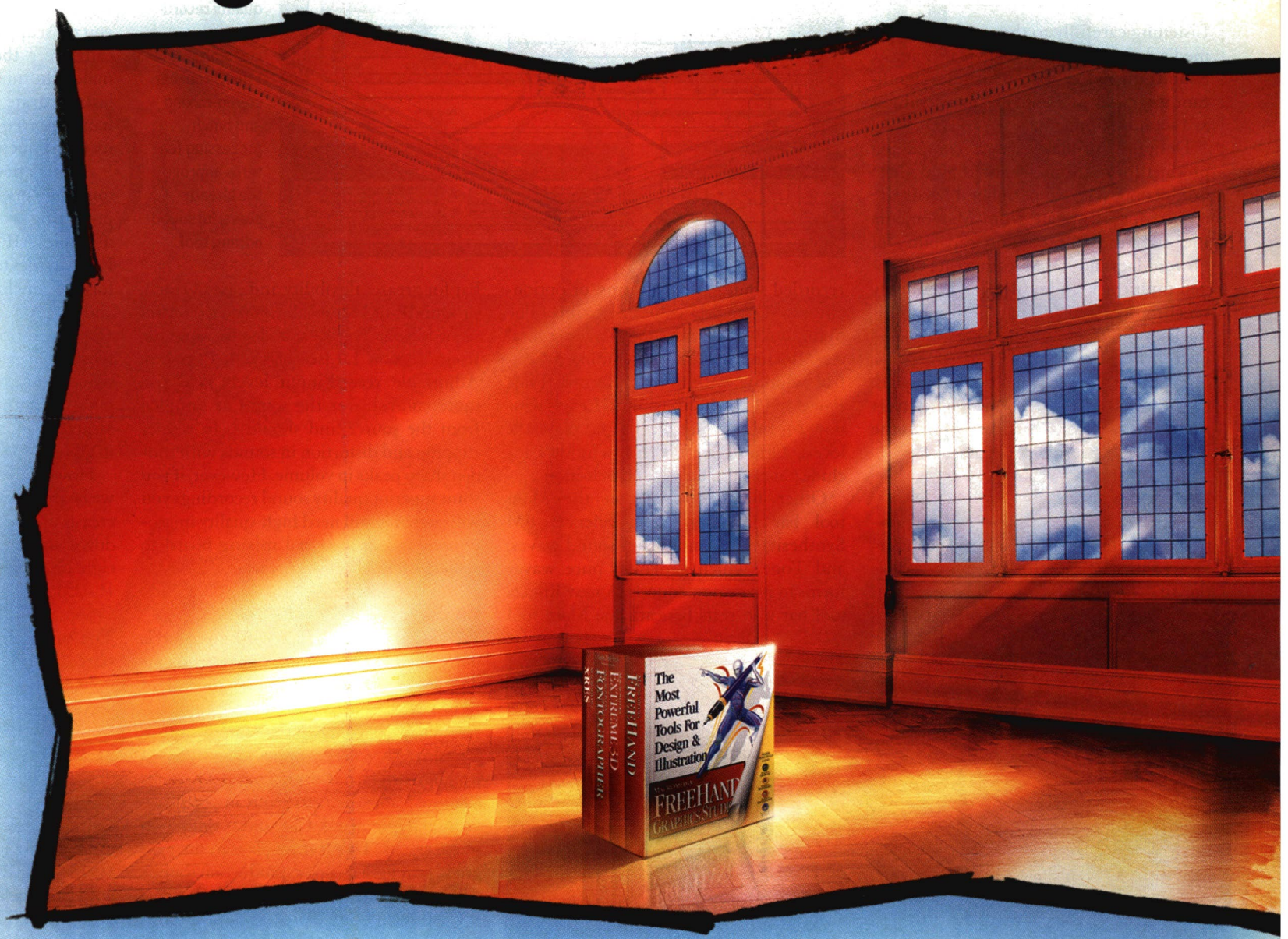

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SoundEdit 16 2.0

Input level controls, stereo mixing make tool good buy

Overall value ◆◆◆◆

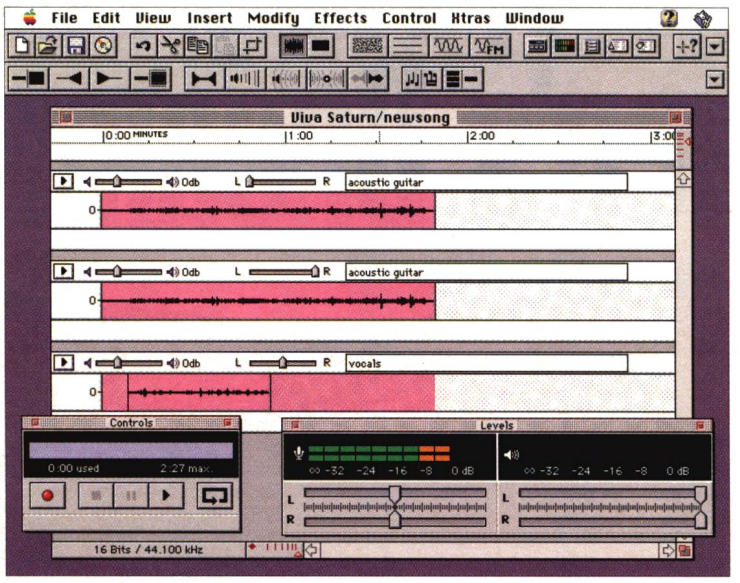
Listening carefully to the needs of multimedia developers for higher-quality audio, SoundEdit 16 Version 2.0 includes significant upgrades that enhance its usefulness as a sound-editing tool.

Designed primarily as a companion product for multimedia and digital video production, with no peripheral hardware required, this update from Macromedia Inc. uses the 16-bit audio capability of Power Macs and AV Macs to create unlimited multitrack audio files and accurately synchronize QuickTime movie soundtracks. With 16-bit resolution, sample rates up to 48 kHz, new sound and data processing features, and native PowerPC speed, the program (with a $299 estimated street price) comes closer to defining itself as the midlevel audio software of choice.

The way in

To achieve better cross-product integration, Macromedia is redesigning the interfaces of all of its software, and SoundEdit is the first to get a face lift. The program opens a Sound window that displays recorded sound as waveforms, or optionally as 2-D or 3-D color spectrums. The Main tool bar provides toggles for several new floating windows, including a Control window with simple Record, Play, Pause and Loop buttons, and a Levels window for monitoring record and playback levels. Other new floating windows include Cue Point, Labels and Selections.

Other features found in the Main tool bar include Noise; Silence; FM Synthesis, which modulates sound waves; and Tone, which generates pure waveforms to create new sounds. A new Effects tool bar also rests beneath the Main tool bar for greater flexibility and ease of reach.



SoundEdit 16's redesigned interface with new Sound, Level and Control windows lets you adjust record-input levels for higher-quality recording. A new, customizable Effects tool bar, stereo-mixing and batch-processing features improve the already-powerful sound-editing tool.

SoundEdit 16 now allows you to control record-input levels, a welcome upgrade from Version 1.0 (see 08.15.94, Page 34). Adjustable record-input levels give you more control over the sound as sampled from the source and should help reduce clipping and distortion in sounds with sudden sharp peaks in volume. However, if you want superior quality sound recordings you will probably still need high-quality microphones and an external mixing board to achieve optimal gain structures.

On the level

We found the control for record-input levels indispensable for recording live instruments direct to the hard disk, although the lack of record-playback monitoring prevents accurate live overdubs and limits SoundEdit 16 as a multitrack recording tool. The updated program offers, however, a new CD Audio Capture feature that efficiently imports conventional premixed CD audio onto two stereo tracks. This feature plays to the program's strength as a post-production sound-editing and soundtrack assembly tool.

Editing and signal processing still stand out as SoundEdit 16's most powerful features. Basic editing functions such as Cut, Paste, Copy, Undo and Crop allow you to reassemble, multiply and delete selected areas of sound. Horizontal and vertical zoom controls alongside the Sound windows let you zoom in closely on a sound waveform or spectrum for precision editing, but the Sound windows still regenerate somewhat slowly when working with larger sound files.

Version 2 also provides an arsenal of 17 effects including Delay, Reverb, Normalize, Backwards, Pitch Shift and a Tempo effect that can play a sound at a slower or faster speed without changing pitch. Some effects have limited parameters compared with many external effects-processing units. For example, the basic delay lets you adjust delay time and delay level, but you can't adjust the number of repeats beyond the single repeat default. On the whole, however, Version 2's effects, such as the seven-band parametric Equalizer, provide a great deal of control over final mix sound quality.

The capability to mix in stereo also stands out as a welcome new feature. Unfortunately, the mix-down process cannot be performed in real time. In other words, you cannot apply effects or do mixing while listening to the soundtracks. Instead, you must apply panning and levels graphically over the sound waveform, which makes the mixing process less intuitive and less accurate. Still, SoundEdit 16's enhanced stereo capabilities improve its utility in the quest for quality audio.

Another new feature, the SoundEdit Automator, provides timesaving batch-file processing. You can simultaneously convert multiple AIFF (Audio Interchange File Format) files to any one of 14 exportable file formats, including .WAV for Windows and Sun.AU. The Automator can also convert the sample rate and size of multiple files and provides dither and brightness options to improve the quality of downsampling to eight-bit, 22-kHz or other lower sample rates commonly used to save space in CD-ROM and Internet export files.

However, even with these new features, we heard an increase in distortion and a decrease in overall sound quality when we downsampled a file from 16 bit, 44.1 kHz to eight bit, 22.05 kHz and further, to eight bit, 11.025 kHz.

SoundEdit 16 can now use plug-in Xtras. The program ships with two to get you started, and Macromedia recently announced that it will include an Xtra to let users directly export Real Audio formats from SoundEdit 16. At press time, Macromedia said users would be able to download the Xtra from an undetermined Web site.

Conclusions

Despite new features that enhance recording, SoundEdit 16 should not be confused with genuine multitrack hard disk recording systems. The program's true power lies in its sound-editing and signal-processing features and its capability to assemble, mix and synchronize multiple audio tracks to create soundtracks for QuickTime movies.

> The capability to mix in stereo is a welcome new feature in SoundEdit 16 2.0

For higher-end needs, Macromedia offers Deck II (with an estimated street price of $299), a software-only, multitrack music- and sound-production system. In fact, most of the shortcomings we found in SoundEdit 16 should be addressed by Deck II (Macromedia offers both programs in a bundle for an estimated street price of $389).

But if you're interested in a software-only solution for post-production sound editing and for creating soundtracks for multimedia and digital video, you'll want to check out SoundEdit 16 Version 2.

Upgrades from previous versions are $129.

Macromedia Inc. of San Francisco can be reached at (415) 252-2000; fax (415) 626-0554; http://www.macromedia.com. — *By Steven Roback*

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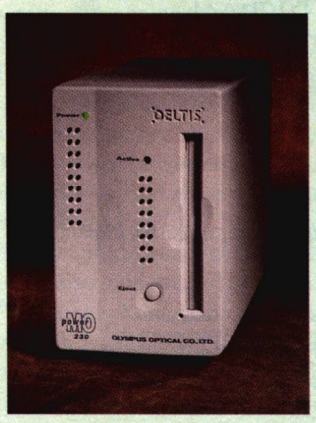

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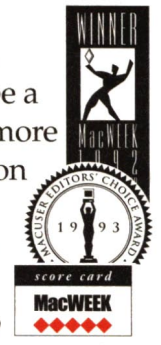

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ISDN ON THE WEB

Looking to take the ISDN plunge? Check out Dan Kegel's ISDN Web page at http://www.alumni.caltech.edu/~dank/isdn/.

ISDN

Users take ISDN challenge: Rewards worth the trouble

By Jeff Ubois

When Benjamin Trister, a partner in human resources law firm Greenberg, Trister, Turner of Toronto, opted for a Netopia router from Farallon Computing Inc. of Emeryville, Calif., he helped make ISDN access to the Internet a reality for his firm.

"Netopia was competitively priced, marketed as easy to install with the support provided," he said. "[And] that's all true."

But for most users, that ease of installation is unusual because there are so many components involved that need to be properly configured, including the Macintosh networking software; the account with the Internet service provider (ISP); the ISDN, or Integrated Services Digital Network, line from a local Bell company; and the router itself.

"I have spent close to $4,000 for routers and software to make ISDN work for me, and 50 to 60 hours of time," said Greg Ames, of Ames and Associates in Redwood City, Calif.

"You have to make sure the provisioning problems are handled right, or you are dead in the water," Ames said. "I've spent hours with the veins on my neck sticking out because the phone company didn't provision the service correctly."

What makes installation so complex is that there are so many variables. "You have four configurations you are dealing with because you have an ISDN line and router at each end," Ames said. "The odds of getting it all done right immediately are limited."

In many places, local Bell companies are still just getting up to speed. "When I had ISDN put into my home, the installer from Pacific Bell was there for five hours waiting for it to get turned on back at the central office," Ames said. "At my office, it was easier — they had prewired the building, and I had a full connection within about 15 minutes."

Ames is using a Pipeline 25 router from Ascend Communications Inc. of Alameda, Calif., and it also took several hours to configure. "You hear about many negative experiences with Ascend in getting it configured," he said, "but it's slick when it's done properly, and it really does give you a transparent network connection."

Ames said for him ISDN service offers a big win over other Internet access options, such as leased 56-Kbps lines.

"Ordering ISDN is not trivial, but it is worth it once you have it."

— Benjamin Trister Greenberg, Trister, Turner

"We are in the process of building a Web business and would have to pay $400 to $500 a month for a full-time [Internet] connection, and now we are paying about $100 to $125 a month," he said.

In fact, because ISDN setup times are so fast, it's almost like having a full-time Internet connection. Because Ames' Internet provider is ahead of the curve, he is even able to accept incoming HTTP (Hypertext Transport Protocol) requests from anyone on the Internet.

Despite the problems, most users of ISDN products are happy with what they get. Trister, who chose Netopia primarily because of an accompanying service guarantee, said, "It installed painlessly, and it's cost-efficient."

It's everywhere you are

The desirability of ISDN routers is geographically dependent because the quality of ISDN service varies widely among the different Bell companies.

For Trister, getting ISDN service was the hardest part. "Ordering ISDN is not trivial, but it is worth it once you have it," he said.

Most ISDN routers have a lot in common, and the differences and incompatibilities between them are beginning to fade as standards for running TCP/IP over basic-rate ISDN stabilize.

In the meantime, however, untangling technical differences between the various products can be challenging. Different vendors take diverse approaches to compression, routing, bridging, remote management, AppleTalk tunneling and dynamic bandwidth allocation (that is, firing up the second ISDN B channel only when it's needed).

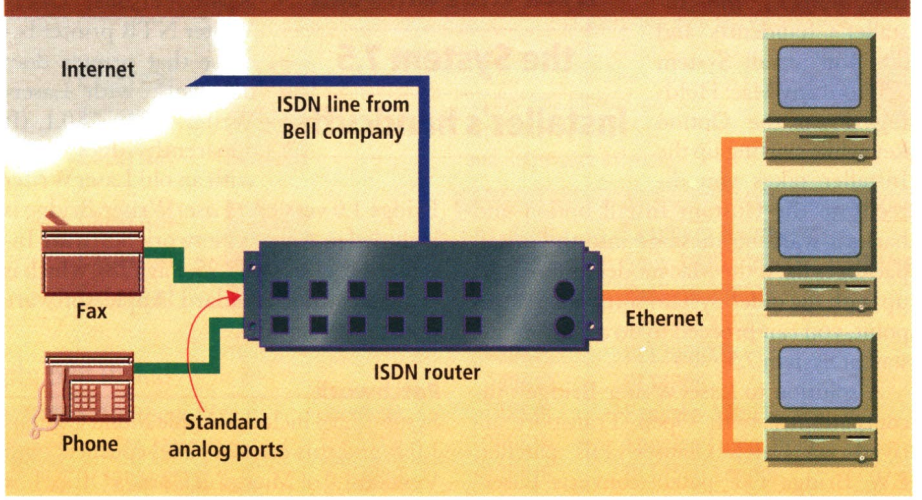
For some users, those differences raise compatibility issues. For example, Trister is unable to dial into the Netopia directly using Motorola Inc.'s BitSurfr (a popular ISDN modem). "Neither Farallon nor Motorola has been able to make that work," he said.

Other important differences between ISDN routers exist in the way they handle POTS (plain old telephone service). Products designed for home use typically have one or two analog phone ports into which users plug a fax machine or standard telephone set. That's a real win for those who need a second line for voice calls. By contrast, many of the router products for the business environment don't offer analog ports.

"The compatibility problems will start getting ironed out this year," said Dan Kegel, a Los Angeles-based engineer who runs his own ISDN Web page, which he created as a service to the Internet commu-

See Solutions, next page

ISDN routers for Internet access



GORDON STUDER

MACINTOUCH

RIC FORD

System 7.5.3 brings memories, raises concerns

Studying current reports about System 7.5.3 triggered a sense of déjà vu and a subsequent search back through past columns. One year ago System 7.5.1 had just arrived, and the scene was not unlike today's. Many Macintosh users were rushing to install the latest Mac OS, and experiences were sharply split. Some had good results, while others experienced disasters. Exactly the same thing is happening with System 7.5.3.

Looking back now, we know about many bugs that were not documented at the time. Some of these were addressed in System 7.5.2, while others engendered various patches. Some of the problems are just now being fixed by System 7.5.3.

More chilling, however, is rereading concerns at that time about the effect of subsequent, larger Macintosh changes on stability. The introductions of PCI-based desktop models and PowerPC laptops, along with System 7.5.2, later brought us some of the worst quality problems in Mac history. Not being able to print or network successfully is not something people can overlook. Crashes and freezes are a serious, continuing problem. We have just learned, and not from Apple, about data corruption from write-cache glitches, plus disk prob-

See MacInTouch, next page

SOLUTIONS

From previous page

nity. "There has been a lot of good work by the California ISDN Users Group and the router manufacturers."

Kegel suggests manufacturers should let customers use Web browsers to configure their routers. "Netscape [Communications Corp.] servers are all configured through a browser, and that works really well," he said.

In addition to the features of each product, it's important to consider the quality of technical support that is available from the vendor and from the Internet service provider at the other end of the line.

Who's offering what?

Many vendors in the networking business have decided in the past six months to begin offering ISDN routers for Internet access.

In the past few months, Cisco Systems Inc. of San Jose, Calif.; Farallon Computing Inc.; Shiva Corp. of Bedford, Mass.; Livingston Enterprises Inc. of Pleasanton, Calif.; Bay Networks Inc. of Santa Clara, Calif.; Telebit Corp. of Chelmsford, Mass.; and U.S. Robotics Corp. of Skokie, Ill., have introduced products. Xyplex Inc. of Boxborough, Mass.; Engage Communication Inc. of Aptos, Calif.; Motorola Inc.; 3Com Corp. and others have joined long-established vendors such as Ascend Communications Inc., Compatible Systems Corp., Gandalf Technologies Inc., Advanced Computer Communications of Santa Barbara, Calif., and IBM Corp. of Armonk, N.Y., in offering products that are ideal for connecting small subnets to the Internet, as well as for LAN internetworking and telecommuting.

Ames' capability to use his ISDN line almost like a leased connection is a clear example of the importance of the service provider's role. In fact, there is a strong argument for buying equipment bundled with Internet access, and many of the dozens of providers now offering ISDN service also sell equipment.

For example, Direct Network Access Inc. of Berkeley, Calif., is offering an ISDN bundle that includes 20 hours of service for $19 a month and also offers a variety of hardware options.

"ISDN is very popular — we have a backlog of orders right now, and Mac users are a big part of that," said Karl Wiebe, DNAI director of network services. "The reason is there is a big advantage in letting everyone on a small local LAN or subnet share a link to the Internet, and with ISDN Ethernet routers, it doesn't matter if you have a whole variety of different systems in your office as long as they can all connect to the Ethernet."

Even for users who don't buy the bundled service, DNAI is recommending Ascend. "We've got all our customers using Ascend hardware with the [Internet Protocol] routing option," Wiebe said.

Ascension of routers

The widespread use of Ascend's equipment by Internet service providers is giving that company some advantage in attracting end users. Part of that goes back to the old single-vendor-solution days: When Ascend routers (or routers from Gandalf Technologies Inc. of Delran, N.J., or a number of others) talk to each other, they are able to fire up compression algorithms that greatly increase throughput. Ascend, for example, uses Stac compression from Stac Inc. of San Diego to achieve 4-1 compression ratios and effective speeds of close to 500 Kbps.

Wiebe is also looking at other products. "We have evaluated the Netopia product, and initial results suggest it may be easier to configure and install," Wiebe said. "For the Mac user, it is a dream piece of hardware, not just because it looks cool, but because of the configuration software and because people with older Macs can plug in via AppleTalk."

Like Trister, Wiebe gave a thumbs up to Farallon's service guarantee. "Farallon will deal with the ISP, order the line from your Bell company — which is usually annoying — and dial in to your router and configure it for you," he said.

Network managers at larger companies are using ISDN routers to provide telecommuters access to the Internet and corporate LANs. For example, Derek Lichter, a senior network analyst with a large financial institution in Boston, is managing close to 100 telecommuters equipped with Ascend Pipeline 50 routers, all of whom dial into the company's Ascend Max 4000. "We settled on Ascend internally because we got a good deal from them," Lichter said. "In terms of raw speed with compression, Gandalf was best, but it didn't — at that time — offer routing.

"We are using mainly Pipeline 50 HX [routers] because you can't manage the Pipeline 25 remotely," Lichter said.

The Ascend products have been Apple-friendly. "AppleTalk hasn't been any problem because Ascend's AppleTalk filters are pretty good," Lichter said. "You can do TCP/IP routing and AppleTalk bridging and make sure that the line comes up and stays down reliably."

While the Ascend routers can open a connection on demand, they don't always shut it down properly.

"One of the things that is hard to do is to make sure links stay down when they should," Lichter said. "We've had to have a lot of users turn off their computers when they aren't in use or, otherwise, turn off certain protocols that broadcast continuously."

Lichter gives Ascend high marks for openness. "Ascend has made an effort to interoperate," Lichter added. "They have their own binding protocol, [called MP+], but they can also work with multilink [Point-to-Point Protocol], and have added synchronous V.120 for serial connected terminal adapters like Motorola's BitSurfr."

What's up with docs

Documentation and technical support are sometimes a problem. "Ascend has the most awful documentation, and the funny thing is the release notes are much better, but they are never integrated," Lichter said. "They might have a fix for Version 4.4 of their software, but you won't read about it in the 4.5 documents."

Lichter advises users to work with their service providers when selecting equipment. "Being able to trust the tech support at your ISP is very important," Lichter said. "It's no fun trying to figure out if the problem is at their end of the line or yours."

ISDN is often the culprit when problems arise. "ISDN cause codes are obscure — you can't easily tell if the problem is at your end, at the [telephone company] or at the ISP's end," Lichter said. "The ISPs I've worked with have sometimes been at fault, but most of the problems here are with Nynex [Corp.], which has a core of people who know what they are doing, but 99 percent of their people don't."

Joshua Burgin, an independent Internet consultant based in Bala Cynwyd, Pa., has worked with ISDN routers from Ascend, Compatible Systems Corp. of Boulder, Colo., and 3Com Corp. of Santa Clara, Calif. He favors Compatible Systems' products, even though they require an ISDN terminal adapter, because its Mac-based configuration software is easier to use and more functional than that available from other vendors.

"The management software uses a [graphical user interface] running under System 7, and it works with all their routers," he said. "You can do Telnet management if you feel like it, but that's a pain." □

MACINTOUCH

From previous page

lems caused by an Apple bug with SCSI ID 5 (see 03.25.96, Page 38).

A consultant told me last week that an all-Mac client company had so many problems with its Power Mac 7500 systems that it is dumping 3,000 Macs for Windows. Oops!

What's ahead? I assume that System 7.5.3 and Open Transport 1.1 will settle down and become relatively stable as System 7.5.1 did over time. But, as happened last year, greater disruptions are coming this fall. The PowerPC Platform will require major changes in the Mac operating system. Other changes will be driven by expanded Apple licensing, technology developments and normal business demands. Will we see a repeat of last fall's quality problems this year? It seems very possible, given the state of the art in software engineering, the financial pressure on Apple and the huge demands of creating a new platform.

Tips and tricks

Moving on to the details of daily Mac management, here are some tips and tricks that may be helpful.

It is nominally impossible to build a universal System 7.5.3 on recent Macs because you can't install the required System 7.5 on these models. Readers found a trick, however, that unlocks the Installer's handcuffs and lets you install System 7.5 from any Mac: Holding down the Option key while starting up the Installer takes you directly to the Custom Install option and hacks a warning message into the install packages list if the Mac model cannot start up with the older System software. At this point, you can proceed to do a Custom install of System 7.5.

Readers found a trick that unlocks the System 7.5 Installer's handcuffs.

A solution to LaserWriter Bridge's incompatibility with Open Transport arrived via Caleb Clauset. His patcher, LW_Bridge_OT_patch, converts LaserWriter Bridge 2.0.1 into a version that works with Open Transport 1.1. An official Apple fix may arrive eventually to supersede this hack. (The patcher is available via my Web site at http://www.macintouch.com/ and may be available elsewhere on-line.)

Clauset notes LaserWriter Bridge patch does not work with the Apple Personal LaserWriter NTR printer because that printer does not work with LaserWriter Bridge 2.0.1. (It apparently does work with an old LaserWriter Bridge 1.0 version.) LaserWriter Bridge is included in Apple's Network Software Installer 1.5.1 (see 06.12.95, Page 38), which is available from standard Apple software update sites on-line.

Patchwork

System 7.5.3 includes Apple Menu Options 1.0.2, and this control panel conflicts with Version 1.0 of Microsoft Corp.'s Office4.2x Update for Power Mac (see 03.18.96, Page 41). Make sure to get Version 1.0.1 of the Microsoft patch from ftp://ftp.microsoft.com/softlib/mslfiles/mc1164.hqx for compatibility.

Logging into a disk protected by Symantec Corp.'s Norton DiskLock and applying System 7.5 Update 2.0 should work correctly if you log in as the "superuser" or a user with full access to the System folder. Logging in and doing the update with reduced privileges, however, can damage the System file, necessitating recovery and reinstallation (after logging in with full privileges).

Connectix Corp.'s Speed Doubler 1.1.2 update addresses a variety of issues, including the file-corruption problem with AppleShare 3.6.1 (see 02.19.96, Page 31). An updater is available from various on-line locations, including the Connectix home page at http://www.connectix.com/. □

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We are the High-end storage configuration Experts. Call us for your solutions on RAID Sytems, Video, Networks, and Jukebox applications. All Platforms.

"Direct Connections provided excellent technical support." **MacWorld July'95**
"Direct Connections' array offered the best performance per dollar of the drives tested." **Digital Video Oct. '94**
"Your next option is to locate...highly visible digital video suppliers like Direct Connections." **NEWMEDIA June '95**
"This array is the one to beat." **Ken Grey** Writer for WIRED, Computer User, MovieMaker, Computer Video, and Digital Video Magazine.
"Stick with a vendor such as Direct Connections that understands how to prepare a RAID for desktop video." **MacWorld April '95**

HOURS: M-F 8:00-8PM SAT 10-2 CST Int'L: 612-937-9771 FAX: 612-937-6285

HARD DRIVES

Differentials available

Only from DC

- 30day money back
- Toll free tech support
- In-house engineers
- Factory direct products
- Award winning service
- $5 million in inventory
- 9 Years in business

Seagate Hawk 2XL

- 1.2GB
- Ultra SCSI 3
- PRML
- Low profile
- Embedded Servo
- 3 yr warranty
- $ 399

5 YEAR WARRANTY

BRAND/MODEL	CAPACITY		ACCESS	RPM	INTERNAL	EXTERNAL
Hitachi 2.5" IDE***	540MB		14MS	5400	$ 245	
Hitachi 2.5" IDE***	810MB		14MS	5400	$ 339	
Hitachi 2.5" IDE***	1.0GIG		14MS	5400	$ 425	
Conner CFP1080	1.2GIG	LP	11MS	5400	$ 295	$ 365
Seagate ST51080N ***	1.2GIG	LP	12.5MS	5400	$ 290	$ 360
Seagate Hawk 2XL***	1.2GIG	LP	9MS	5400	$ 399	$ 469
Seagate Hawk	2.4GIG	LP	9MS	5400	$ 655	$ 725
Conner CFP2105S	2.1GIG	LP	9MS	5400	$ 499	$ 569
Conner CFP2107S	2.1GIG	LP	8MS	7200	$ 759	$ 829
Quantum Capella	2.2GIG	MR	8.6MS	5400	$ 699	$ 799
Quantum Atlas	2.1GIG	LP	8MS	7200	$ 795	$ 865
Seagate Barracuda 2	2.5GIG	LP	8MS	7200	$ 815	$ 885
Seagate Barracuda 2W	2.5GIG	LP	8MS	7200	$ 939	$ 999
Conner CFP2107W	2.5GIG	LP	8MS	7200	$ 795	$ 895
Fujitsu M2934S	4.2GIG	MR	8MS	7200	$ 1125	$ 1195
Fujitsu M2934W	4.2GIG	MR	8MS	7200	$ 1175	$ 1275
Seagate Barracuda 4	4.1GIG		8MS	7200	$ 1195	$ 1265
Seagate Barracuda 4W	4.1GIG		8MS	7200	$ 1255	$ 1325
Seagate ST15230N	4.3GIG		9MS	5400	$ 899	$ 999
Conner CFP4207S	4.2GIG		9MS	7200	$ 1045	$ 1115
Conner CFP4207wide	4.2GIG		9MS	7200	$ 1099	$ 1199
Quantum Atlas	4.3GIG		8.6MS	7200	$ 1099	$ 1169
Seagate Elite 9	9.0GIG		11MS	5400	$ 2095	$ 2195
Seagate Elite 9W	9.0GIG		11MS	5400	$ 2295	$ 2395

CD RECORDERS/PLAYERS

Ricoh 2 speed recorder / 2 speed player

4 speed Recorder
4 speed Player
4 GIG Hard drive
10 Blank CD's
1 Toast Software
$2995

Includes Free software and 2 CD's

Yamaha 4 speed Recorder / 4 Player	External	$ 1749
Yamaha 2 speed Recorder / 4 speed Player	External	$ 1145
Yamaha 2x4 Recorder with built in hard drive	External	$ 1529
Pioneer 4 speed 6-Disc CD-ROM Changer	External	$ 325
Toshiba 3701 6 speed CD Player	External	$ 370
Pioneer 4 speed CD Player	External	$ 255

Many CD Tower Configurations available. Upto 500 Disks!

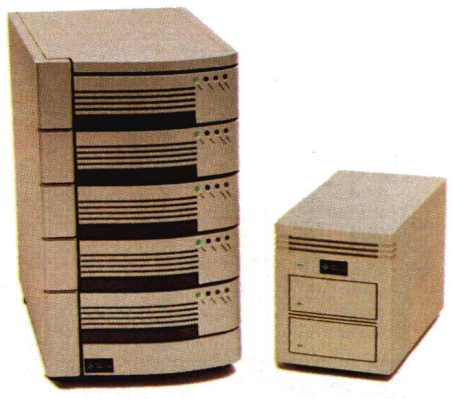
MEDIA

128MB	Optical	$ 15	10 Blank CD's	$ 69
230MB	Optical	$ 25	90M 4MM Tape	$ 8
1.3GIG	Optical	$ 69	160M 8MM Tape	$ 18

"Stick with a vendor such as Direct Connections that understands how to prepare a RAID for desktop video." MacWorld April '95

RAID SYSTEMS

FAST DESKTOP OR SERVER



- **28mb/sec sustained sequential Writes.**
  Tested with MacBench on PowerMac 9500.
  12GIG with 2 PCI accelerator cards $ 7799

From Hardware RAIDS to Software RAIDS, we'll show you how to configure the best system to meet your needs.

External, Remus software, and cabling

• 4 GIG Fast and Wide Raid	$ 2199
• 8 GIG Fast and Wide Raid	$ 2799
• 16 GIG Fast and Wide RAID	$ 6130
• 28 GIG Fast and Wide RAID	$ 9499
• 40 GIG Fast and Wide RAID	$ 15599

Atto Silicon Express IV	$ 835
Atto Express PCI MC	$ 765
Atto Express PCI SC	$ 345
Adaptec AHA-2940UW	$ 245
SCSI Expander	$1345

MEDIA 100 TARGA 2000 radius

OPTICAL DRIVES

2.6GIG Sony Optical for $1959 external including all cabling, and software!!

1 YEAR WARRANTY

CAPACITY	MODEL	EXTERNAL
230MB	Fujitsu	$ 499
1.3GB	NEC	$ 1295
1.3GB	Sony 4MB cache	$ 1695
2.6GB	Hitachi	$ 1895
2.6GB	Sony	$ 1959
26GB	Sony Jukebox	$ 4695
52GB	Sony Jukebox	$ 6295

TAPE BACK-UP

We are the tape-backup Experts

2 YEAR WARRANTY

With 2.5MB/sec sustained transfer, the DLT2000XT is perfect for digital video or pre-press with large data files.

All systems include one tape cartridge, cabling, and Retrospect software.

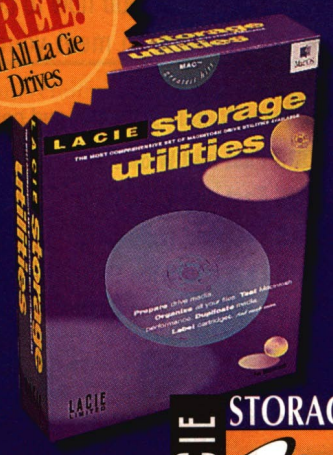
CAPACITY	MODEL	MEDIA	INTERNAL	EXTERNAL
-4GIG	Tandberg Panther	1/4"	$ 469	$ 539
-8GIG	Sony 7000 DDS-2* 1.5MB/sec	4MM	$ 1199	$ 1299
-14GIG	Exabyte 8505XL	8MM	$ 2065	$ 2125
-10GIG	Exabyte 8505S	8MM	$ 1475	$ 1575
-30GIG	DLT2000XT	1/2"		$ 3299
-40GIG	DLT4000	1/2"		$ 5399
-140GIG	Exabyte-10h Library	8MM		$ 4999
-200GIG	Spectra Logic 4000	4MM		$ 8599
-200GIG	DLT4500 Loader	1/2"		$ 8999

DIRECT CONNECTIONS 7668 Executive Drive Eden Prairie, MN 55344 Gov't, Corp, and Univ. P.O's accepted. *1YR Warranty 30 day money back does not apply towards media and software.

LACIE LIMITED

offers a world of storage solutions

La Cie Storage Utilities FREE!* With All La Cie Drives



All products bearing this Storage Utilities mark include acclaimed Silverlining Disk management software plus four other vital performance enhancements, a $99 value... **FREE!**

1995 MAC HOME JOURNAL READERS' CHOICE

MAC HOME JOURNAL

Industrial Design Excellence Award SILVER 1994

I.D. Magazine 40TH ANNUAL DESIGN REVIEW WINNER 1994

MACUSER EDITORS' CHOICE AWARD 1995 FINALIST

MACWORLD MW EDITORS' CHOICE

TSUNAMI HARD DRIVES

ALL-TIME Favorite!

- Complete with switchable active termination, cables and La Cie Storage Utilties.
- High-speed drive and disk-controller technology.
- Up to 4.3GB capacity in a 6.5"x8.5"x2.2" compact case.

$349 Quantum 1280 MB

850MB Quantum Trailblazer	5400 rpm	3 yr. warr.	$259
1080MB Quantum Fireball	5400 rpm	3 yr. warr.	$329
1280MB Quantum Fireball	5400 rpm	3 yr. warr.	$349
2160MB Ultrastar ES IBM	5400 rpm	3 yr. warr.	$599
4.3GB Quantum Atlas	7200 rpm	5 yr. warr.	$1099

INTERNAL HARD DRIVES

In Stock! NOW Shipping!

- High-performance drive and controller technology.
- Built-in SCSI interface.

$289 Quantum 1280 MB

3.5" Hard Drives			Brackets available for $10 with internal hard drive purchase.
850MB Quantum Trailblazer	5400 rpm	3 yr. warr.	$189
1080MB Quantum Fireball	5400 rpm	3 yr. warr.	$249
1280MB Quantum Fireball	5400 rpm	3 yr. warr.	$289
2160MB Ultrastar ES IBM	5400 rpm	3 yr. warr.	$499
4.3GB Quantum Atlas	7200 rpm	5 yr. warr.	$999

TOWER JOULE DRIVES

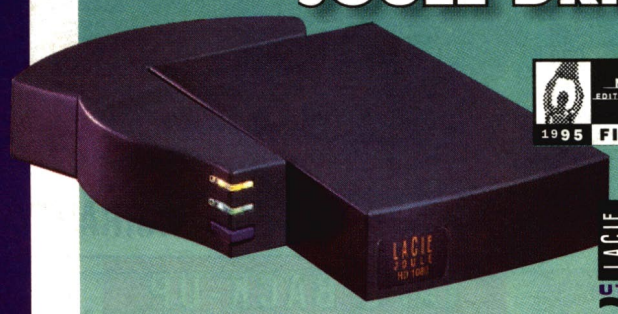
3.5" Drives with Mount		For use in Tower with a Joule Base.
850MB Quantum Trailblazer	3 year warranty	$329
1080MB Quantum Fireball	3 year warranty	$369
2160MB IBM Ultrastar ES	5 year warranty	$799
4.3GB Quantum Atlas	5 year warranty	$1099
8.0GB DAT DDS-2	Includes Retrospect	$959
8.0GB TURBO DAT DDS-2	Includes Retrospect	$1159
230MB Optical	1 year warranty	$529

Joule Bases – Supports Stacks Up To 6 Drives High		
850MB Quantum Hard Drive	3 year warranty	$389
1080MB Quantum Hard Drive	3 year warranty	$489
2160MB IBM Ultrastar ES Hard Drive	3 year warr	$699
230MB Optical	1 year warranty	$529

Joule RAID		Quantum drives bundled with Trillium Research Software configurable to levels 0, 1, 4 & 5.	
		RAID Drives Only	RAID with SCSI Card
4.2GB	3 year warranty	$1999	$2299
8.4GB	3 year warranty	$3499	$3799
16.8GB	3 year warranty	$6999	$7299
25.8GB	3 year warranty	$9999	$10299

Joule System Accessories		
Half-Height Mount Only	For most hard drive modules	$109
Full-Height Mount Only	For DAT, Optical & 4.3GB modules	$129
Base Only	Includes power supply and SCSI ports	$199
Dock Only	Allows any module to be used as a portable drive	$129

PORTABLE JOULE DRIVES



MACUSER EDITORS' CHOICE AWARD 1995 FINALIST

- Share hard disk-sized files with diskette convenience.
- Docking provides new security and backup solutions.
- Unplug and go for convenient data transport.

$799 Joule 2 GB

3.5" Drives with Dock		
850MB Quantum Trailblazer	3 year warranty	$329
1080MB Quantum Fireball	3 year warranty	$369
2160MB IBM Ultrastar ES	5 year warranty	$799
8.0GB DAT DDS-2	Includes Retrospect	$959
8.0GB TURBO DAT DDS-2	Includes Retrospect	$1159
230MB Optical	1 year warranty	$529

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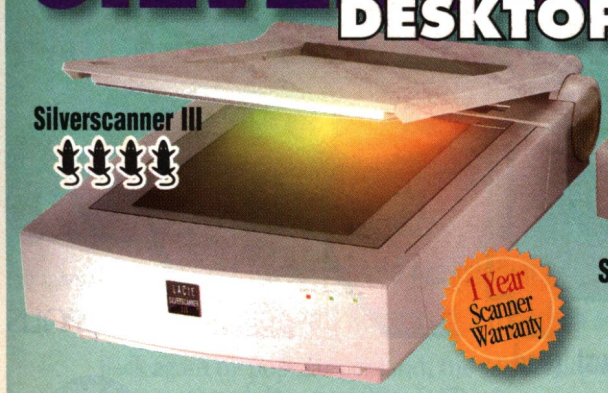
International 503-520-9000
Fax 503-520-9100 (24 hrs.)
http://www.lacie.com/~lacie

* La Cie Storage Utilities FREE with the purchase of a La Cie Drive. Call for details, conditions, limited money back guarantee, and free offers. Prices do not include shipping and only apply to products shipped within the continental United States. Add sales tax where applicable. Tsunami, Joule, Joule Portable, Silverlining, La Cie and the La Cie logo are trademarks of La Cie, Ltd. All other trademarks are the property of their respective companies. All prices, specifications, terms, warranties, descriptions, products and services herein are subject to change without notice or without recourse. © Copyright 1996 La Cie, Ltd. All rights reserved.

SILVERSCANNER
DESKTOP SCANNERS



Silverscanner III

Silverscanner DTP ½

MacUser BEST BUY

1 Year Scanner Warranty

Silverscanner DTP Complete
Desktop color, 400x800dpi interpolated to 3200 dpi.
- ▲ Photoshop LE
- ▲ Read-It Pro OCR
- ▲ Silverscan

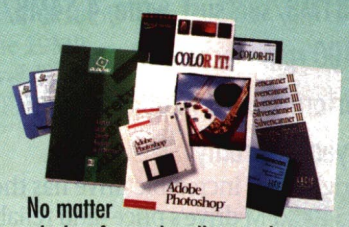
$899

Silverscanner III Package 1
Pro color, 600x1200dpi interpolated up to 4800 dpi.
- ▲ Color It!
- ▲ Read-It Pro OCR
- ▲ Silverscan

$1499

Silverscanner III Package 2
Pro color, 600x1200dpi interpolated up to 4800 dpi.
- ▲ Photoshop (full)
- ▲ Read-It Pro OCR
- ▲ Silverscan

$1799

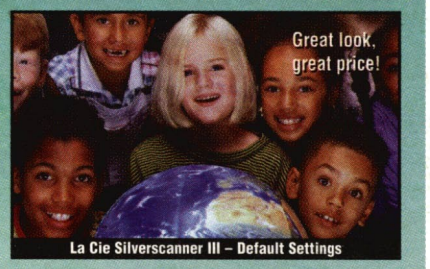


No matter which software bundle you choose, you'll also receive Silverscans' award-winning scanning software giving you professional scans.

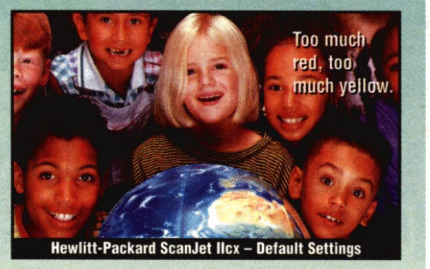
Transparency Adapter **$799**

Sheet Feeder **$499**

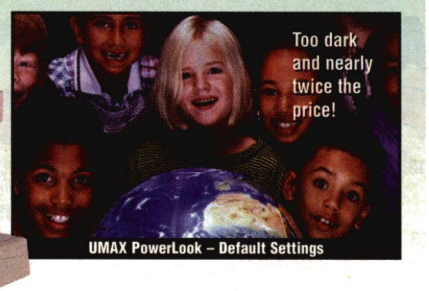
$140,000 Drum Scanner – Default Settings



La Cie Silverscanner III – Default Settings



Hewlitt-Packard ScanJet IIcx – Default Settings



UMAX PowerLook – Default Settings

SYQUEST DRIVES

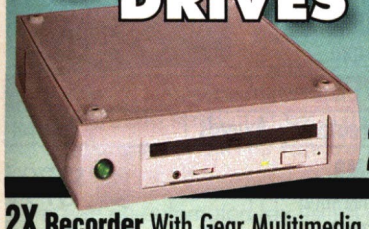
LA CIE & SYQUEST EXCLUSIVE OFFER! Includes coupon for 2nd cartridge by mail for a total of 2 FREE cartridges! ($99.90 value)

$187 EZ135

EZ135MB	Includes **ONE FREE** cartridge and coupon for **2nd FREE** cartridge by mail!	2 yr warr.	$187
135MB Cartridge			$19.95

CD-R DRIVES

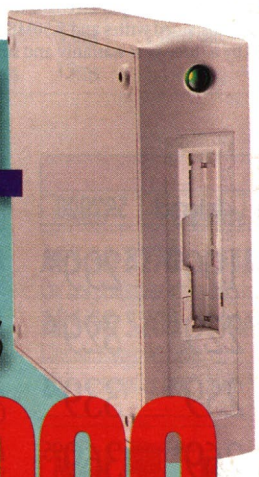
- ▲ CD-Rs ship with Gear Multimedia ($500 value!)
- ▲ 1 MB Cache.
- ▲ Exclusive packet writing.



$989 2X Recorder

2X Recorder With Gear Mulitimedia		$989
4X Recorder With Gear Mulitimedia		$1599
650MB CD-R Disk 74 Minutes	10 Disk Pack	$79

OPTICAL AND DAT DRIVES



LaCie Storage Utilities

- ▲ Optical is the new standard in removable reliability.
- ▲ DAT – The ideal medium for data backup.

$1999 2.6GB Optical

Other Optical		
230MB PowerBook Internal	1 year warranty	$399
230MB Internal	1 year warranty	$399
230MB External	1 year warranty	$469
230MB Optical Cartridge		$19.95
2.6GB External	1 year warranty	$1999
2.6GB Optical Cartridge		$99

DAT Drives Includes Retrospect	
2.0GB DAT External	$699
8.0GB DAT DDS-2 External	$899
8.0GB Turbo DAT DDS-2 External	$1099

LACIE LIMITED

offers

award-winning customer support

30 Day Money Back Guarantee

Toll Free Technical Support

Factory Direct Quality & Value

Ready to Plug And Play

Toll-free tech line:

1-800-288-9919

GREAT PRODUCTS... PRICELESS SUPPORT

APS Technologies

2 GIGS, GREAT DEAL!

7200 rpm Performance, 5400 rpm Price

WOW! $499.95 Internal configuration

MICROPOLIS

APS MS 2000

- ✔ 7.31MB/sec. sust. write, 4.54MB/sec. sust. read
- ✔ 5400 rpm mechanism
- ✔ Performs like a 7200rpm drive
- ✔ 5-year warranty

Power Matched for Power PC

That's right, this incredible drive has the performance you'd expect from a 7200 RPM mechanism but with a 5400RPM drive's price -and reliability! The APS MS 2000 formats to 2047MB; delivers sustained reads at up to 4.54 MB/sec. and sustained writes at up to 7.31 MB/sec; has an avg. access time of 20ms and avg. seek of 9.6ms. It has a 5-year warranty and is rated at 650,000 MTBF.

HIGH PERFORMANCE 1.2GB

APS Q 1280

JUST $269.95 Internal configuration

Quantum

- ✔ High areal density and PRML read channel
- ✔ 5400 rpm mechanism
- ✔ Available in a SCSI or Fast ATA-2 interface
- ✔ 3-year warranty

Power Matched for Power PC

Finally there's a hard drive that combines the reliability of a 5400 rpm mechanism with high performance. The new APS Q 1280 is capable of 4.39MB per second sustained writes and 5.50MB per second sustained reads, making it great for any demanding application. It is backed by a three-year warranty and supports a 500,000 hour MTBF.

1GB INCREDIBLE DEAL!

APS I 1080

IBM

$229.95 Internal configuration

- ✔ Over 1GB capacity with Fast SCSI-2 interface
- ✔ IBM Magneto-Resistive (MR) head technology
- ✔ 5400 rpm mechanism
- ✔ 3-year warranty

Power Matched for Power PC

Exceptional value, high performance, low power - what more could you ask? The APS I 1080 formats to 1034MB and delivers sustained transfer rates of 3.32MB /sec. (read) and 3.67MB/sec. (write). Rated at 350,000 hours MTBF, the APS I 1080 has a three-year warranty.

APS SCSI DRIVES

Model	Capacity/Features	Awards	Internal	SR2000
APS Q 840 Quantum 840 Trailblazer	811MB 4500 rpm	ZD LABS ★★★★	$199.95	$299.95
APS I 1080 IBM 1080 Deskstar XP	1034MB 5400 rpm	Power Matched	229.95	329.95
APS Q 1080 Quantum 1080 Fireball	1042MB 5400 rpm		259.95	339.95
APS Q 1280 Quantum Fireball II 1280	1222MB 5400 rpm	Power Matched	269.95	Internal Low Power 369.95
APS I 2160 IBM Ultrastar ES	2063MB 5400 rpm	Power Matched	499.95	Internal Low Power 599.95
APS MS 2000 Micropolis 4421	2047MB 5400 rpm	ZD LABS ★★★★	499.95	599.95
APS ST 4200 Seagate ST 15230N Hawk	4094MB 5400 rpm		899.95	999.95

APS IDE DRIVES FOR MACINTOSH

Model	Capacity/Features	Internal
APS Q 1280A Quantum Fireball II 1280	1222MB 5400rpm (Fast ATA-2)	Internal Low Power 249.95
APS ST 2140A Seagate Medalist ST32140A	2167MB 5400rpm (Fast ATA-2)	349.95

CALL FOR YOUR **FREE** SPRING 1996 CATALOG

Featuring Our Complete Line Of APS Drives, Supplies & Accessories

APS HIGH-PERFORMANCE SCSI DRIVES

Model	Capacity/Features	Awards	Internal	SR2000
APS MS 2.0 Micropolis 4221	1955MB 7200 rpm	Power Matched, ZD LABS ★★★½	$599.95	$699.95
APS MS 2.0Av Micropolis 4221AV	1955MB 7200 rpm	Power Matched	699.95	799.95
APS Q 2.0 Quantum Atlas XP32150	2050MB 7200 rpm	Power Matched, ZD LABS ★★★★	699.95	Internal Low Power 799.95
APS ST 2.0 Seagate ST 32550N	2047MB 7200 rpm		749.95	849.95
APS MS 4.0 Micropolis 3243	4064MB 7200 rpm	Power Matched, ZD LABS ★★★★	999.95	1099.95
APS Q 4.0 Quantum Atlas XP34300	4101MB 7200 rpm	Power Matched, ZD LABS ★★★★½	999.95	1099.95
APS MS4.0Av Micropolis 3243AV	4064MB 7200 rpm	Power Matched	1099.95	1199.95
APS ST 4.0 Seagate ST 15150N	4094MB 7200 rpm	ZD LABS ★★★½ ◆◆◆◆	1199.95	1299.95
APS MS 9.0 Micropolis 1991	8669MB 5400 rpm	Internal Low Power	1899.95	2099.95
APS MS9.0Av Micropolis 1991AV	8669MB 5400 rpm	ZD LABS ★★★★	1999.95	2199.95
APS ST 9.0 Seagate ST410800N	8669MB 5400 rpm		2199.95	2399.95

Power Matched for Power PC — These products are performance-matched for optimal performance in the Power PC environment.

APS FAST/WIDE SCSI DRIVES

Model	Capacity/Features	Awards	Internal	SR2000
APS MS 2.0W Micropolis 4221W	1955MB 7200 rpm	Power Matched	$699.95	$799.95
APS Q 2.0W Quantum Atlas XP32150W	2050MB 7200 rpm	Power Matched	799.95	Internal Low Power 899.95
APS MS 4.0W Micropolis 3243W	4064MB 7200 rpm	Power Matched	1099.95	1199.95
APS Q 4.0W Quantum Atlas XP34300W	4101MB 7200 rpm	Power Matched	1099.95	1199.95

FAST/WIDE ADAPTER CARDS

Model	External SCSI Connection	Internal
QLogic Fast!SCSI Mac PCI-W Adapter for Fast/Wide drives	HD 68-Pin	$379.95
Silicon Express IV For NuBus Quadras & Power Macs only. Fast/Wide adapter card.	HD 68-Pin	849.95

APS SCSI POWERBOOK DRIVES

Model	Capacity/Features	Awards	Internal
APS I 1.2 IBM Travelstar XP	1160MB 4900 rpm		$699.95

APS IDE POWERBOOK DRIVES

Model	Capacity/Features	Awards	Internal
APS Q 810 Quantum Europa	778MB 3800 rpm, Fast ATA-2	Internal Low Power	$379.95
APS Q 1.08 Quantum Europa	1037MB 3800 rpm, Fast ATA-2		474.95

World Class Winner Macworld · MACWORLD MW EDITORS' CHOICE · MACWORLD MW SERVICE HERO · MacUser RECOMMENDS · 1993 Readers' Choice Winner · 1994 Mac Home Journal Readers' Choice · BMUG · Best Technical Support · MACWORLD 1993 World Class Award Winner · MacUser ZD LABS · MAC HOME Journal Award · WINDOWS Magazine 1995 WIN 100 · MacWEEK

APS TECHNOLOGIES

BACK(UP) BY POPULAR DEMAND

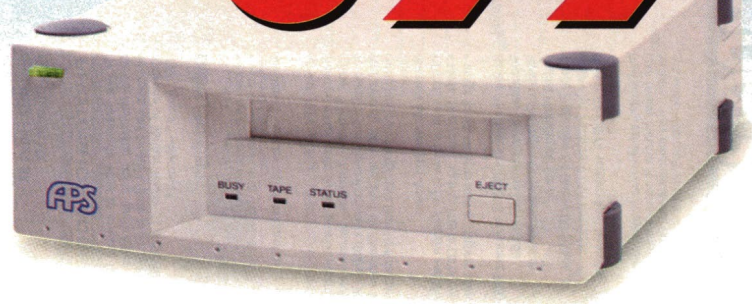
Call us 24 hours a day, 7 days a week

APS DAT

- ✔ 2GB native capacity per 90m tape
- ✔ Twice the speed of old model – up to 19MB per min.
- ✔ Excellent for server and workstation backups
- ✔ Includes the latest Retrospect 3.0 backup software – **FREE**

Back again by popular demand, the APS DAT packs up to 2GB of uncompressed data on a 90m DAT tape at a remarkable 19MB per minute, nearly twice as fast as a standard DAT drive! To backup a workstation or a small network, the APS DAT delivers both entry level price and professional performance.

JUST $699.95 *External configuration*



FAST 8GB DDS-2 BACKUP

APS HyperDAT®

- ✔ Up to 8GB of storage on one 120m DAT tape*
- ✔ High transfer rates of up to 28MB per minute*
- ✔ Compatible with all DDS-1 and DDS-2 media
- ✔ Includes the latest Retrospect 3.0 backup software – **FREE**

$899.95 *External configuration*

Delivering backup speeds as high as 28MB per minute, this DDS-2 backup system can pack up to an incredible 8GB on a single 120m DAT tape!* The APS HyperDAT is compatible with other DDS-1 DC and DDS-2 DC drives. Perfect for office and network backup and archiving! **With hardware compression* **Assumes 2:1 compression ratio*

MORE MEGS THAN EZ, ZIPPIER THAN ZIP!

APS SQ 3270 – 255MB REMOVABLE

- ✔ 2-year warranty
- ✔ 1.7MB/sec. transfer rates
- ✔ Packs up to 255MB on each 3.5" cartridge
- ✔ Best performing removable cartridge drive

WHILE SUPPLIES LAST! $299.95* *External configuration*

**Only with the purchase of one SQ 270 cartridge*

	Capacity	Access	Seek	Read Trans.	Write Trans.	Warranty	Price per MB
APS SQ 3270	255MB	27ms	13ms	1.8m/sec.	1.6m/sec.	2-year	$1.17
Zip	96MB	45ms	33ms	1.0m/sec.	1.0m/sec.	1-year	$2.07
EZ135	128MB	27ms	13ms	1.1m/sec.	0.8m/sec.	1-year	$1.80

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APS DLT TAPE BACKUP SYSTEMS

Model	Capacity/Features	Awards	SR2000
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Model	Features	Awards	Internal	SR2000
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APS PD4 600MB optical storage with 4X CD-ROM in one device	CD-ROM/Removable Optical		N/A	499.95*
APS CD-R FREE TOAST CD-ROM Pro CD recording software ($500 value)	Recordable CD-ROM		N/A	999.95*
APS CD-R Pro FREE TOAST CD-ROM Pro CD recording software ($500 value)	4X4 Performance CD-R		N/A	1999.95*
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Model	Capacity/Features	Awards	SR2000
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Radius FPD Card	Mac Plus	Mono	–	–	–
Radius Pivot Card	SE/30	256	–	–	–
Xceed Color 30hr	SE/30	256	256	256	256
Lapis Color 16	SE/30	Thousands	Thousands	256	256
Lapis Color 24	SE/30	Millions	Millions	256	256
Radius Direct Color/gx	IIsi	Millions	–	–	–
SuperMac Spectrum 8	IIsi	256	256	256	256
SuperMac Spectrum 8.24	IIsi	Millions	256	256	256

Video Card	Platform	Monitor (Colors) 14/15"	16/17"	19/20"	21"
Radius FPD Card	Mac SE	Mono	–	–	–
SuperMac Superview	Mac SE	–	–	Mono	–
Radius TPD Interface	Mac SE	–	–	–	Mono
RasterOps 8/LC	LC/PDS	–	–	256	–
SuperMac Spectrum 8	LC/PDS	256	256	256	256
Lapis Color 16 for LC	LC/PDS	Thousands	Thousands	256	256
Micro Conversions 1724	LC/PDS	Millions	Millions	256	256
Lapis Color 24 for LC	LC/PDS	Millions	Millions	256	256

Video Card	Platform	Monitor (Colors) 14/15"	16/17"	19/20"	21"
Double Color SX	Nubus	256	256	16	–
RasterOps 708+	Nubus	256	–	256	–
RasterOps 24L	Nubus	Millions	–	–	–
RasterOps 8/LC	Nubus	–	–	256	–
SuperMac Spectrum 8	Nubus	256	256	256	–
Double Color LX	Nubus	256	256	256	256
Radius Direct Color 24	Nubus	–	–	–	Millions
E-machines Futura MX	Nubus	Millions	Millions	Millions	–

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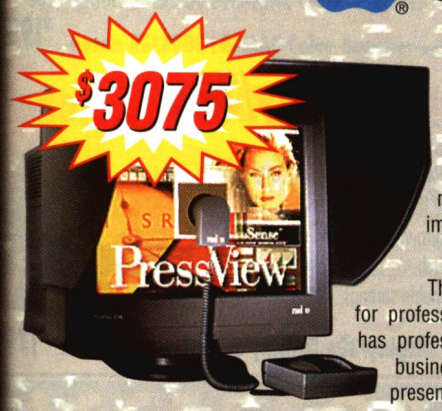

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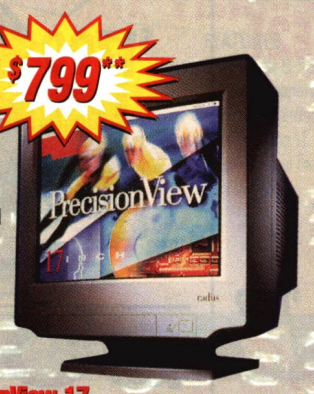
Radius PressView 21SR



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Radius PrecisionView 17

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AGFA

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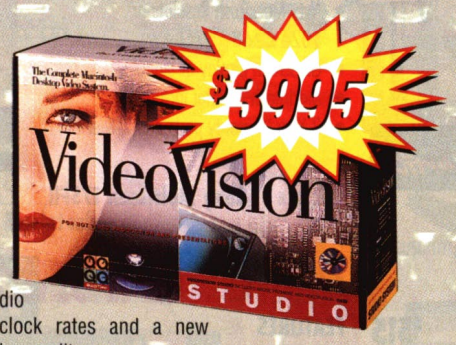
radius

Radius VideoVision® Studio PCI



VideoVision Studio PCI includes all of the same features as the original, plus some key enhancements. The new version provides 16-bit, 48kHz audio synchronized to video clock rates and a new encoder that improves video quality.

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A revolutionary digital imaging camera that brings production-quality image capture to the desktop. Leaf Lumina's technology consists of a single pass, rapid-scanning, tri-linear array containing 2700 elements per R, G and B.

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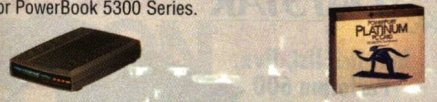

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Call your Syex representative for full details on the GE Service Protection Plus warranty.

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Hewlett-Packard ScanJet 4c Scanner	$929

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MONITORS

NEC

17" MultiSync XV17+

FEATURES
- 17" Flat Square Technology CRT
- 15.6" Viewable Image Size
- MAC Resolution up 1024 x 768 NI
- 0.28 mm dot pitch
- On-Screen Manager

N026 1032 **17" MultiSync XV17+** $799

21" MultiSync XE21

FEATURES
- 21" Diagonal Flat Square Screen
- 19.8" Viewable Image Size
- MAC Resolution up to 1152 x 870 NI
- 0.28 mm dot pitch
- AccuColor, Digital controls
- Monitor Manager

N026 1010 **21" MultiSync XE21** $1799

15" MultiSync XV15+

FEATURES
- 15" Flat Square Technology CRT
- 13.8" Viewable Image Size
- Max Resolution: 1024 x 768
- 0.28 mm dot pitch

N026 1031 **15" MultiSync XV15+** $469

15" C500 Monitor

- 15" Flat Square, AntiStatic, Non-glare CRT
- 13.8 Viewable Image Size
- Max Resolution: 1024x768
- .28mm dot pitch
- On screen controls
- ONE year Warranty

NEW PRODUCT

N026 1033 **15" C500 Monitor** $399

14" C400 Monitor

- 14" AntiStatic, Non-glare CRT
- 13.2" Viewable Image size
- .28mm dot pitch
- Max Resolution: 832x624
- ONE year Warranty

NEW PRODUCT

N026 1029 **14" C400 Monitor** $299

radius

PressView 21SR Display System

FEATURES
- Resolution up to 1600 x1200
- 21" .25m high performance DiamondTron display
- Exclusive light-absorbing "Stealth" coat that improves the display's color and contrast by preventing the user's clothing from reflecting off the CRT.
- Includes ProSense display Calibrator, ColorShield™ Hood and Display management software version 1.6.
- Color management support for AGFA FotoTune 1.0 & 2.0, Apple colorSync 1 & 2, EFIColor, and Kodak Precision.

R016 1034 **PressView 21SR Display System** $3199

R016 1031 **PressView 17SR Display System** $1999

IntelliColor Display/20e

FEATURES
- Preset resolutions: 640 x 480 at 60Hz up to 1380 x 1040 at 74hz
- 20-inch Trinitron, vertically flat tube
- 15.2 in x 11.5 in maximum viewing area
- 0.31mm Phosphor Trio Pitch
- 10 pre-sets, 15 programmable settings

BEST BUY

R016 1009 **IntelliColor Display/20e Display System** $1799

SONY

Multiscan 15SFII

FEATURES
- 13.9" Viewable image size
- .25 mm Aperature Grille Pitch
- Max Macintosh Resolution: 1024 x 768 ™ 75hz
- On screen display of digital screen controls
- 3 Year Warranty parts and 2 Year CRT

S106 1017 **Sony Multiscan 15SFII** $515

Multiscan 17SFII

FEATURES
- 16.0" Viewable image size
- .25 mm Aperature Grille Pitch
- Max Macintosh Resolution: 1024 x 768 ™ 75hz
- On screen display of digital screen controls
- Macintosh Adapter included
- 3 Year Warranty parts and 2 Year CRT

S106 1018 **Sony Multiscan 17SFII** $915

Multiscan 17SEII

FEATURES
- 16.0" Viewable image size
- .25 mm Aperature Grille Pitch
- Max Macintosh Resolution: 1024 x 768 ™ 75hz
- On screen display of digital screen controls
- Macintosh Adapter included
- 3 Year Warranty parts and 2 Year CRT

S106 1019 **Sony Multiscan 17SEII** $1095

VIDEO CARDS

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Thunder 30 PCI Cards

- 30-bit color with built-in photoshop Acceleration
- Real-time CMYK-to-RGB display
- On-the-fly resolution and bit-depth switching

R013 1070 **Thunder 30/1152** PCI Card $799
Resolution up to 1152 x 870

R013 1073 **ThunderColor 30/1600** PCI Card $1999
Resolution up to 1600 x 1200

XCLAIM GA

ATI's renowned *mach64* graphics acceleration chip gives the XCLAIM GA its exceptional abilities. It features 2MB or 4MB of VRAM,& displays up to 16.7 million accelerated colors at 1152x870 resolution.

A143 1010 **ATI XCLAIM GA** 2MB PCI video card $369

A143 1009 **ATI XCLAIM GA** 4MB PCI video card $499

NUMBER NINE VISUAL TECHNOLOGY

Imagine 128

- 128-bit graphics engine
- 128-bit internal data path
- 128-bit memory bus
- Exclusive WideBus™ design means drawing pathways are a full 128-bits wide from processor to high speed VRAM

N080 1002 **Imagine 128** 8MB Accelerator $1169

N080 1003 **Imagine 128** 4MB Accelerator $729

DIGITAL VIDEO

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VideoVision Studio 2.5.1

Broadcast-Quality Video
VideoVision studio can deliver broadcastable quality video output in NTSC and PAL timings.

16-bit Audio
VideoVision Studio can now simultaneously capture video with 16-bit, 44.1 KHz stereo sound using the on-board audio of the Power Macintosh.

R013 1018 **Videovision Studio 2.5.1** $2399

Radius Telecast Upgrade

Telecast combines component video, professional audio with an open architecture to give video professionals hardware and software choices. Telecast reinvents the entire post production process providing options for producing quality programming in a variety of formats.

R013 1077 **Telecast Upgrade** $3459

TRUEVISION Targa 1000

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T043 1003 **Targa 1000** (PCI Power Macintosh) $2699

T043 1001 **Targa 2000** (PCI Power Macintosh) $2995*
* as low as $2995 w/qualified trade-in)

ACCELERATORS

DAYSTAR DIGITAL

66MHz Turbo 601

Mac IIci, IIsi, IIvx, Performa 600

Runs your current sotware up to twice as fast, and it lets you run PowerPC accelerated applications 7 to 11 times faster.

D040 1039

100MHz PowerPro 601

Quadra and Centris (610, 650, 700, 800, 900, and 950 series)
- Transforms your Mac into a top of the line PowerPC workstation
- Works with your current memory
- 64-bit data path further increases performance
- Requires System 7.5

D040 1018 **40/Mhz Turbo 040** with 128K cache $599

D040 1043 **100Mhz PowerPro 601** with 1MB cache $1199

D040 1048 **100Mhz Turbo 601** $1139

MicroMac Technology

Carrera040

MAC IIci, IIisi, IIcx, or IIx
Just plug in the Carrera040 accelerator and instantly get blazing performance from your existing Mac

M264 1003 **40/80Mhz Carrera 040** with FPU $599

SCANNERS

ES1200C Pro EPSON

FEATURES
- 600 dpi optical resolution, and up to 4800 dpi(via interpolation)
- 30-bit color scanning
- Pro Package includes:
  Adobe Photoshop
  Scantastic
  KAI's PowerTools
  SCSI cable

E045 1003 **Epson ES1200C Pro-MAC Color Scanner** Full Package **$1179**

E045 1007 **Epson ES1200C LE-MAC Color Scanner** w/Scantastic **$949**

Powerlook II UMAX

The Magic of Color

FEATURES
- 36-bit color scanning, 600 x 1200 dpi
- 3.3 Dynamic Range
- Includes Transparency Adapter
- Package includes:
  Adobe Photoshop
  KAI's PowerTools SE
  PowerPhotos CD
  WordLinx OCR
  Pixar Typestry
  Pixar 128CD

U010 1052 **PowerLook II** 36-bit color scanning, 600 x 1200 dpi **$2495**

Arcus II AGFA

FEATURES
- 600 dpi & 36-bit color scanning
- 3.0 Dynamic Range
- Includes Transparency Module
- Package includes:
  - Adobe Photoshop
  - Agfa FotoLook Scanner driver software
  - Agfa FotoTune Color Management software
  - "How To" Guide to Scanning

A055 1001 **AGFA Arcus II** **$2195**

Epson ES1000C

FEATURES
- 400 dpi optical resolution, and up to 3200 dpi(via interpolation)
- 30-bit color scanning
- Package includes:
  Adobe Photoshop LE 3.0
  Xerox TextBridge
  SCSI cable
  Scantastic PIM & DA

E045 1013 **Epson ES1000C LE-MAC Color Scanner** **$735**

Umax Vista-S12 LE

FEATURES
- 600 dpi & 33-bit equivalent analog gamma correction
- Package includes Adobe Photoshop LE 3.0, WordLinx OCR, Corel Professional Photos CD

U010 1055 **Vista-S12 LE** **$799**

MICROTEK ScanMaker III

FEATURES
- 600 dpi & 36-bit color scanning
- Includes Transparency Adapter
- Single pass scanning
- DCR (Dynamic Color Rendition) calibration/correction system
- Apple ColorSync compatible
- Package includes Adobe Photoshop

M150 1006 **Microtek ScanMaker III** **$1989**

ACCESSORIES

VISIONEER PaperPort Vx

FEATURES
- 6 second typical scan time
- 400 dpi resolution
- 256 Gray-scale imaging
- Scan Documents up to 30" long
- Includes OmniPage Lite, CardScan SE, PictureWorks Copier

V029 1008 **PaperPort Vx for Macintosh** **$279**

WACOM Art Z II 6" x 8" ArtPad

Don't buy a tablet that uses batteries...get a WACOM

W010 1028 **ArtZ II 6x8** **$298**

MODEMS

GLOBAL VILLAGE COMMUNICATION TelePort Platinum Fax/Modem

G050 1016 **TelePort Platinum** 28.8 data, 14.4 S/R, GlobalFax, GlobalFax OCR **$199**

US Robotics 28.8 Sportster

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FEATURES
- 28.8 V.34 and 33.6 kbps
- V.32 bis at 14.4 kbps
- V.42/mnp 2-4 error control
- Macverter Fax and Data Software
- CD-ROM containing Internet Access Software
- Discover the World Wide Web with your Sportster Guidebook

U020 1021 **US Robotics 28.8 Sportster for Mac** **$199**

PowerPort Pro PC Card

Simultaneous 28.8 10BT Ethernet

G050 1019 **PowerPort Platinum Pro** **$499**
Combo 10base-T Ethernet, 28.8 data, 14.4 S/R, Fax, Type II PC Card

FastMac V.34 28.8 Fax/Data Modem

FEATURES
- 28.8 kbps data modem
- 14.4 kbps send/receive fax
- Class 1 or 2 fax support
- V.42/MNP2-4 error control
- V.42bis/MNP5 data compression
- MacComCenter software for Mac

B030 1007 **Fast Mac V.34 28.8 bps Fax/Data Modem** **$139**

PRINTERS

EPSON Stylus Color Pro

FEATURES
- 720 x 720 dpi photo quality on plain paper
- PostScript upgradeable
- True black laser quality text
- Pantone matching
- Text print speed up to 3ppm, color 1ppm

E047 1019 **Epson Stylus Color Pro** **$599**

E040 1069 **Adobe PostScript Level 2** Software Upgrade for Stylus Color Pro **$199**

HEWLETT PACKARD LaserJet 5MP

FEATURES
- 600 x 600 dpi laser printing with HP Resolution Enhancement technology
- 120 levels of grey
- 6 ppm print speed
- 3MB RAM standard, expandable up to 35 MB w/Adobe Memory booster
- Adobe PostScript level 2 with 35 scale typefaces

H047 1030 **HP LaserJet 5MP Printer** **$1045**

Epson Stylus Color Pro XL

FEATURES
- Prints up to 12.5" x 18" full bleed in Photoquality color
- 720 x 720 dpi photo quality with Microdot technology
- Optional Adobe PostScript with Pantone Color Calibration

E047 1022 **Epson Stylus Color Pro XL** **$1799**

E040 1070 **Adobe PostScript Level 2** Software Upgrade for Stylus Pro XL **$265**

HP DeskJet 850C InkJet

FEATURES
- ***COLOR PRINTER***
- Dual I/O for either PC or Macintosh connection
- Black print speed up to 6ppm
- Color print speed up to 2ppm
- Handles plain and special papers, transparency film, envelopes, avert labels and index cards.

H047 1041 **HP DeskJet 850C InkJet Printer** **$515**

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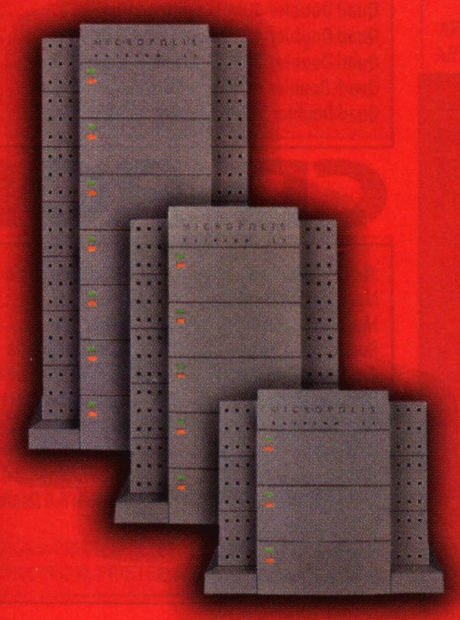

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Model #	Capacity
MDLT2100/AV	2.1 GB
MDLT4300/AV	4.3GB
MDLS9100/AV	9.1GB

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Capacity	Model No.	Mechanism	Seek	Warranty	Internal	PHASER-I
420 MB	DT-420TB	Quantum	11ms	2 yrs	$150	$225
850 MB	DT-850TB	Quantum	11 ms	2 yrs	$199	$275
1.05 GB	DT-51080	Seagate NEW LOW PRICE!	10.0 ms	5 yrs	$269	$344
1.0 GB	DT-1080FB	Quantum	11ms	3 yrs	$269	$344
1.05 GB	DT-31230	Seagate NEW LOW PRICE!	9.0 ms	5 yrs	$380	$455
2.0 GB	DT-4221	Micropolis NEW LOW PRICE!	8.0 ms	5 yrs	$545	$625
2.0 GB	DT-2490	Hewlett Packard	9.0 ms	5 yrs	$950	$1,050
2.1 GB	DT-32550	Seagate Barracuda II NEW LOW PRICE!	8.0 ms	5 yrs	$725	$800
4.3 GB	DT-3243	Micropolis NEW LOW PRICE!	8.5 ms	5 yrs	$999	$1,075
4.3 GB	DT-15230	Seagate Hawk 4 NEW PRODUCT!	9.0 ms	5 yrs	$899	$975
4.3 GB	DT-15150	Seagate Barracuda NEW LOW PRICE!	8.0 ms	5 yrs	$1,175	$1,250
9.0 GB	DT-1991	Micropolis NEW LOW PRICE!	12 ms	5 yrs	$1,950	$2,050
9.0 GB	DT-410800	Seagate Elite 9 . NEW LOW PRICE!	11 ms	5 yrs	$2,025	$2,125

AUDIO/VIDEO TUNED DRIVES

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Capacity	Model No.	Mechanism	Seek	Warranty	Internal	PHASER-I
1.05 GB	DT-31230AV	Seagate	9 ms	5 yrs	$380	$455
2.0 GB	DT-4221AV	Micropolis NEW LOW PRICE!	8.5 ms	5 yrs	$600	$775
2.1 GB	DT-32550AV	Seagate Barracuda	8.0 ms	5 yrs	$725	$800
4.3 GB	DT-3243AV	Micropolis NEW LOW PRICE!	8.5 ms	5 yrs	$1,050	$1,125
4.3 GB	DT-15150AV	Seagate Barracuda	8.0 ms	5 yrs	$1,175	$1,250
9.0 GB	DT-1991AV	Micropolis NEW LOW PRICE!	12 ms	5 yrs	$2,050	$2,150
9.0 GB	DT-410800AV	Seagate Elite 9 NEW LOW PRICE!	11 ms	5 yrs	$2,025	$2,125

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Capacity	Model No.	Mechanism	Warranty	Internal	PHASER-I
2.1 GB	DT-32550W	Seagate Barracuda 2LP Wide	5 yrs	$799	$899
2.1 GB	DT-4221W	Micropolis 4221Wide	5 yrs	$625	$725
4.3 GB	DT-15150W	Seagate Barracuda 4 Wide	5 yrs	$1,225	$1,325
4.3 GB	DT-3243W	Micropolis 3243Wide	5 yrs	$1,050	$1,150
9.0 GB	DT-1991W	Micropolis 1991Wide	5 yrs	$2,085	$CALL
9.0 GB	DT-1991AVW	Micropolis 1991AVWide	5 yrs	$2,185	$CALL
9.0 GB	DT-410800W	Seagate Elite 9 Wide	5 yrs	$CALL	$CALL

DISK ARRAYS/RAID

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Capacity	Model No.	Mechanism	Seek	Warranty	EXTERNAL
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8.0 GB	DT-3243WAV	Micropolis - Fast/Wide 3243AV (2)	4.0 ms	5 yrs	$CALL
18.0 GB	DT-1991WAV	Micropolis - Fast/Wide 1991AV (2)	4.0 ms	5 yrs	$CALL

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ATTO Silicon Express IV	Nubus Fast/Wide Accelerator	$CALL
ATTO Express PCI	Dual Channel - PCI -Fast/Wide	$CALL
ATTO Express PCI	Single Channel - PCI-Fast/Wide	$CALL

SYQUEST

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Capacity	Model No.	Internal	PHASER-I
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200 MB	SQ5200	$420	$480
270 MB	SQ3270	$420	$470

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JVC Personal Archiver (2X)	$1,165
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4-8 GB	Sony-5000	DDS-2	$999
4-8 GB	HP-1533A	DDS-2	$1,250
5-10 GB	Exabyte-8505	8mm	$2,150
15-30 GB	DLT-2000XT	DLT	$4,399

OPTICAL

INCLUDES ANUBIS FORMATTING SOFTWARE AND ONE CARTRIDGE

Capacity	Model No.	Seek	PHASER-I
230 mb	Fujitsu	30 ms	$675
1.3 GB	HP-C1716	23 ms	$1,999
1.3 GB	Maxoptix T-III	18 ms	$2,199

MEDIA

Type	Price
Syquest 44	$40
Syquest 88	$46
Syquest 105	$54
Syquest 200	$76
Syquest 270	$60
Optical 128 MB	$22
Optical 230 MB	$30
Optical 1.0 GB	$100
Optical 1.3 GB	$90

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16MB 70/60NS	299/301
32MB 60NS	596

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32MB70NS	1219

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4MB 70NS	$129

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8MB 70NS	349
16MB 70NS	520

168-pin DIMMs

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16MB 60NS	289
32MB 60NS	582
64MB 60NS	1125

PBDUO 210/230 Series

PB DUO-4MB	$169
PB DUO-8MB	299
PB DUO-12MB	479
PB DUO-14MB	549
PB DUO-20MB	698
PB DUO-28MB	1172

What type of Memory do I need?

Standard 30-Pin Simms:
Plus, SE, SE 30, Classic, Classic II, Color Classic, LC, LCII, Performa 200, Performa 400-430, Performa 600, Quadra 900/950, Mac II, IIx, IIcx, IIsi, IIci, IIfx, IIvx, IIvi.

Standard 72-Pin Simms:
Quadra 605/630, 610, 650, 700, 800/840AV, LCIII, LC475, LC630, Performa 450-560, 575 and 6115CD, PowerMac 6100, 7100, 8100, WS 80, WS60, WS 95, WS 6150 and WS 8150, 9150.

168 Pin Dimms:
PowerMac 9500, 8500, 7500, 7200

PowerMac Memory Selection Guide

PowerMac 6100

(8MB) Standard 72-pin SIMMS

To upgrade your RAM to:	You need to order:
16MB	(2) 4MB 70/60NS
24MB	(2) 8MB 70/60NS
40MB	(2) 16MB 70/60NS
72MB	(2) 32MB 60NS

PowerMac 7100, 8100

(8MB) Standard 72-pin SIMMS

To upgrade your RAM to:	You need to order:
16MB	(2) 4MB 70/60NS
24MB	(2) 8MB 70/60NS
40MB	(2) 16MB 70/60NS
72MB	(2) 32MB 60NS
136MB	(4) 32MB 60NS
264MB *(7100 only)*	(8) 32MB 60NS

PowerMac 9500, 8500, 7500

(16MB) Standard 168-pin DIMMS

To upgrade your RAM to:	You need to order:
32MB	(2) 8MB 70NS DIMMS
48MB	(2) 16MB 70NS DIMMS
80MB	(2) 32MB 70NS DIMMS
144MB	(2) 64MB 70NS DIMMS

PowerMac 7200

(8MB) Standard 168-pin DIMMS

To upgrade your RAM to:	You need to order:
24MB	(2) 8MB 70NS DIMMS
64MB	(2) 16MB 70NS DIMMS
128MB	(4) 32MB 70NS DIMMS
256MB	(4) 64MB 70NS DIMMS

FPUs/CoProcessors Video RAM

FPU's/Math CoProcessors

Centris FPU 25MHz	$189
FPU 33MHZ DUO/P600	52
FPU Color Classic 16MHZ	44
FPU LCIII 25 MHZ	49
FPU LC/LCII 16 MHZ	49
LC575 33MHZ Math CoProc.	285

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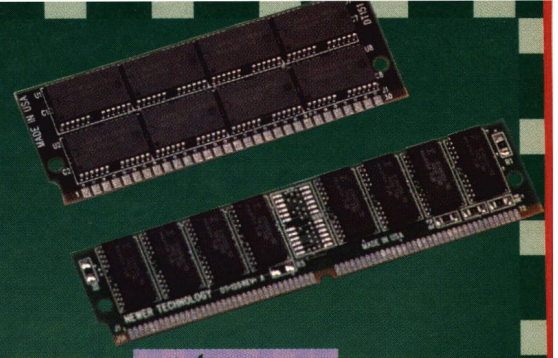

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☐ 01. Yes ☐ 02. No

1 What is your organization's primary business activity at this *entire* location? (Select one only) Write Answer Here ➡

Non-Computer Related
01. Graphic Arts
02. Publishing
03. Advertising, Public Relations, Promotion
04. Digital Media Development
05. Entertainment/ Broadcast
06. Commercial Printer
07. Service Bureau/ Pre-Press
08. Aerospace
09. Architecture, Engineering
10. Telecommunications
11. Government
12. Manufacturing
13. Education: College/ University/Trade
14. Education: High School/Elementary
15. Finance: Banking, Accounting, Insurance, Real Estate, Legal
16. Health, Medical
17. Non-Computer Retailer, Wholesaler, Distributor
18. Research and Development
19. Agriculture, Mining, Construction, Oil
20. Transportation, Utilities

Computer Related
22. Manufacturer (Computers, Software, Peripherals)
23. VAR, VAD, Systems/ Network Integrator
24. Retailer/Distributor
25. Systems House/Data Processing Service
26. Computer Consultant
27. Other Businesses and Services
99. Other_____ (please specify)

2 What is your job function? (Select one only) Write Answer Here ➡

A. Networking/Data Communications
B. MIS/DP/Information Systems
C. Systems Engineering
D. Telecommunications
E. Graphic Arts/Design
F. Production/Pre-Press
G. Video Production
H. Audio Production
I. Communications/ Publishing/Public Relations/Advertising
J. Engineering/Architecture
K. Science/Research & Development
L. Education/Training/ Development
M. Manufacturing/ Operations/Production/ Quality Control
N. Administration/ Management/Personnel
O. Accounting/Finance/ Legal
P. Sales/Marketing
Q. Purchasing
R. Consulting
Z. Other_____ (please specify)

3 Which of the following brands of systems and/or applications software do you have installed at this *entire* location? (Check all that apply)

Operating Systems
☐01. System 7
☐02. System 6, 5 or earlier
☐03. Unix/Xenix/AUX/AIX
☐04. PowerOpen
☐05. Windows 3.X
☐06. Windows NT
☐07. Windows 95
☐08. NeXTStep
☐09. Solaris
☐10. OSF/Motif
☐11. Other_____ (please specify)

Network Operating Systems
☐13. Novell NetWare
☐14. Unix/NFS
☐15. LAN Manager
☐16. Banyan VINES
☐17. AppleShare
☐18. DEC PathWorks
☐19. Other_____ (please specify)

Groupware
☐21. Lotus Notes
☐22. Windows for Workgroups
☐23. FirstClass
☐24. Novell GroupWise
☐25. Apple Open Collaboration Environment (AOCE)
☐26. Other_____ (please specify)

Database Engines
☐28. Oracle
☐29. Sybase SQL Server
☐30. Ingres
☐31. Informix
☐32. 4D Server
☐33. DB2
☐34. Other_____ (please specify)

On-Line Services
☐36. America Online
☐37. CompuServe
☐38. e-World
☐39. Prodigy
☐40. Internet
☐41. Delphi
☐42. Genie
☐43. Other_____ (please specify)

4 Please indicate the quantities of the computers currently installed and indicate the computers planned for purchase in one year at this *entire* location.

(Write in accurate quantities for all that apply.)

	Currently Installed (Quantity)	PLAN TO PURCHASE
Macintosh/Compatible		
Apple Power Mac 8100	1.	1.☐
Apple Power Mac 7100	2.	2.☐
Apple Power Mac 6100	3.	3.☐
Radius Power Mac Compatible	4.	4.☐
Power Computing Power Mac Compatible	5.	5.☐
Daystar Power Mac Compatible	6.	6.☐
Other Power Mac Compatible	7.	7.☐
Macintosh Quadra	8.	8.☐
Macintosh Centris	9.	9.☐
Macintosh Performa	10.	10.☐
Macintosh PowerBook	11.	11.☐
Macintosh Duo	12.	12.☐
Macintosh Other (II, LC, SE, etc...)	13.	13.☐
Other Mac Compatible	14.	14.☐
Other Desktops		
IBM/Compatible Desktop/Laptop/Notebook	15.	15.☐
PowerPC (Non-Mac Compatible)	16.	16.☐
Workstation (SPARC, MIPS, HP/Apollo, etc.)	17.	17.☐
Other Microcomputers	18.	18.☐

USE NUMBERS ONLY

5A How many servers are installed at this *entire* location? (Use numbers only)

5B How many LANs are installed at this *entire* location? (Use numbers only)

5C How many Macintoshes are connected to the LANs indicated in Question 5B above? (Use numbers only)

6 If applicable: how many Macintoshes are sold, resold, or recommended in one year at this *entire* location? (Answer one only)

A. Retailer: Number sold per year_____
B. Reseller: Number resold per year_____
C. Consultant: Number purchased by your clients through your firm's recommendation per year_____
D. Other: Number sold/resold/recommended per year_____
☐ E. Not Applicable

7A Which of the following Macintosh-related products do you specify, recommend, buy or approve the purchase of? (Check all that apply)

Systems
☐01. Apple Macintoshes
☐02. Mac Compatibles
☐03. IBM Compatible Micros
☐04. Servers
☐05. Workstations
☐06. Minis/Mainframes
☐07. Newton PDA
☐08. Pen-Based Computers

Networking
☐10. LANs
☐11. WANs
☐12. Mac to PC Links
☐13. Mac to Mini/ Mainframe Links
☐14. Mac to Unix Workstation Links
☐15. Modems
☐16. Communication/ Network Software
☐17. Bridges/Routers/ Gateways
☐18. Hubs
☐19. NICS

Printers
☐21. Laser
☐22. Color Laser
☐23. InkJet
☐24. Color InkJet
☐25. Dye Sub
☐26. Thermal Wax
☐27. Plotter
☐28. Portable Printer

Image Input
☐30. Digital Camera
☐31. Flatbed Scanners
☐32. Handheld Scanners
☐33. Slide Scanners
☐34. Drum Scanners
☐35. Black/White Scanners

Displays
☐37. 14 inch
☐38. 15 inch
☐39. 17 inch
☐40. 21+ inch
☐41. LCD Projection Panel
☐42. Presentation Monitors

Peripherals
☐44. UPS
☐45. External Speakers
☐46. Input Devices
☐47. Video Deck
☐48. Image Setter

Storage
☐50. Photo CD
☐51. Magneto Optical
☐52. RAID
☐53. Hard Drive 1 Gig +
☐54. Hard Drive < 1 Gig

Add-In Boards
☐56. CD Recorder
☐57. Memory Boards
☐58. Display Boards
☐59. Video Digitizer Boards
☐60. Accelerator Boards
☐61. Sound Boards
☐62. MIDI
☐63. Video Capture/ Compression
99.☐ None of the above

• Your Signature _____
Title _____ Date ___/ ___/___

7B Which of the following systems and/or applications software do you specify, recommend, buy or approve the purchase of? (Check all that apply)

Graphic Arts
☐01. Desktop Publishing
☐02. Electronic Publishing
☐03. Painting/Drawing Programs
☐04. Photo Retouching
☐05. Page Layout
☐06. Illustration Programs
☐07. Fonts
☐08. Pre-Press
☐09. Color Management
☐10. Digital Video
☐11. Other_____ (please specify)

Multimedia
☐13. Authoring Software
☐14. Video Editing
☐15. Sound Editing
☐16. Music Composition/ Editing
☐17. Animation
☐18. Clip Media (Sound and Art)
☐19. Other_____ (please specify)

Presentation Graphics
☐21. Presentation Software
☐22. Multimedia Presentations
☐23. Charting Program
☐24. Other_____ (please specify)

Design/Engineering
☐26. CAD/CAM
☐27. 2/D - 3/D Modeling
☐28. Simulation
☐29. Other_____

Business Applications
☐31. Word Processing
☐32. Spreadsheets
☐33. Databases
☐34. Project Management
☐35. Accounting/Payroll
☐36. Groupware
☐37. Desktop Video Conf.
☐38. Document Management
☐39. Mapping/GIS
☐40. Pen-Based Applications
☐41. Other_____ (please specify)

Systems Management
☐43. Operating Systems
☐44. Utilities
☐45. Applications Development
☐46. CASE
☐47. Programming Languages
☐48. Compilers
☐49. SQL Applications
☐50. Client Server Applications
☐51. Other_____ (please specify)
99.☐ None of the above

8 If you indicated purchasing involvement for computers, computer products or services in Question 7A or Question 7B, for how many Macintoshes do you have this involvement? (Select one only) Write Answer Here ➡

01. 2000+ 02. 1000-1999 03. 500-999 04. 100-499 05. 50-99 06. 20-49 07. 10-19 08. 5-9 09. 1-4 99. None

9 For what applications are the Macintoshes at your location used? (Check all that apply)

☐ 01. Graphic Arts
☐ 02. Presentation Graphics
☐ 03. Multimedia
☐ 04. Design/Engineering
☐ 05. Business Applications
☐ 06. Systems Management
☐ 99. Other_____ (please specify)

10 Over the course of one year, do you specify, recommend, buy, or approve the purchase of host systems, desktops, networking products, peripheral equipment and/or software worth: (Write number in box)

1. $5,000,000 or more
2. $2,500,000 to $4,999,999
3. $1,000,000 to $2,499,999
4. $600,000 to $999,999
5. $400,000 to $599,999
6. $200,000 to $399,999
7. $100,000 to $199,999
8. $50,000 to $99,999
9. $25,000 to $49,999
10. $10,000 to $24,999
11. Less than $10,000
99. None

Product Category	For this location (Write number in box)	For other locations (Write number in box)
Host Systems (Mainframes/Minis)	A.	G.
Desktops/Portables (Micros/Workstations)	B.	H.
Networking Products (include Servers)	C.	I.
Peripheral Equipment	D.	J.
Software Products	E.	K.
Service/Support	F.	L.

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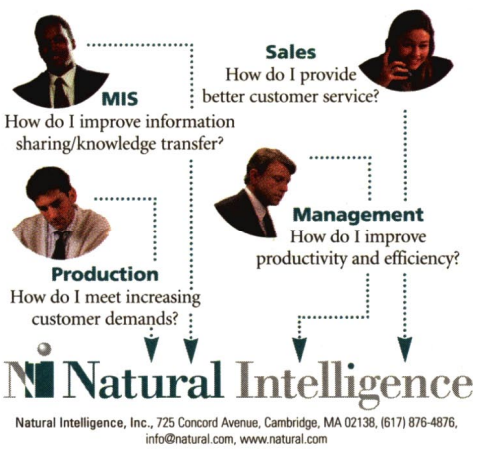
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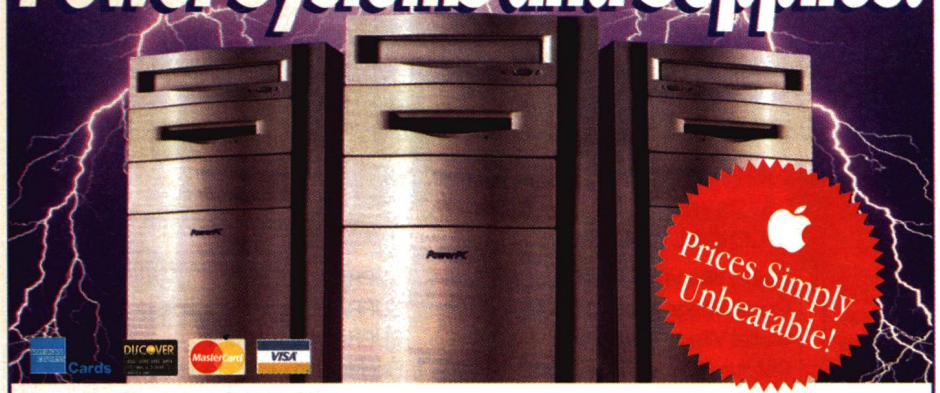

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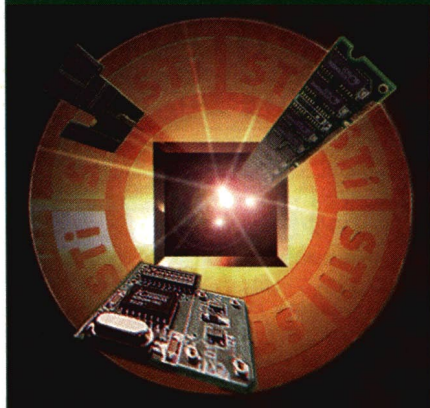

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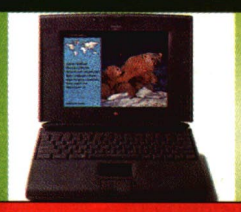
PowerBook 540c



The PowerBook 540c is one of Apple's top of the line color PowerBook computer, combining the high performance Motorola 68LC040 processor with an active matrix color display • It has 68LC040 processor running at 66/33 Mhz. upgradable to PowerPC processor • Built in ethernet and video out port supporting most Apple monitor display. 4 Mb of RAM expandable to 36 MB • Optional 19.2bps Global Village fax modem• High capacity Type II nickel metal hydride • Weight : 7.3 lbs

4MB /320 HD $1999*

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Apple Factory Refurbished

7200/75 8MB/500/CD

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StyleWriter 1200 InkJet

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7500/100 computer is a professional computer with a new architecture that offers more flexible capabilities than previous models. • 100-MHz PowerPC 601 processor, user upgradable to 604 processor•Built-in floating-point processor and 32K cache •Three industry-standard PCI expansion slots

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PowerPC 604 processor running at 120Mhz•Three industry-standard PCI expansion slots•Quadruple CD ROM•16 Mb of RAM expandable• Built in ether-net and more NEW PRODUCT!

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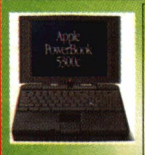

5300c/100 provides the high performance of PowerPC processor technology and long battery life in the highest-quality color PowerBook. Its advanced color display makes it ideal for work with graphics or presentations. •Provides a 10.4-inch (diagonal), backlit,active-matrix, color display with 256 or thousands of colors •Features PC Card slots and an expansion bay, for flexibility and expandability

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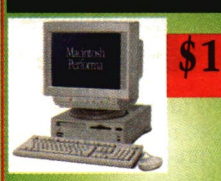

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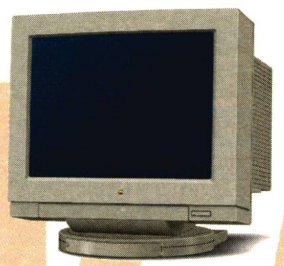

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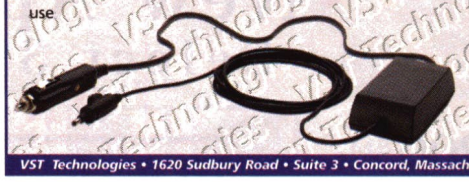

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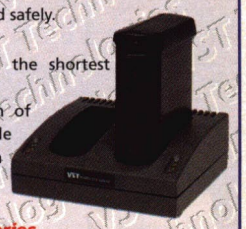

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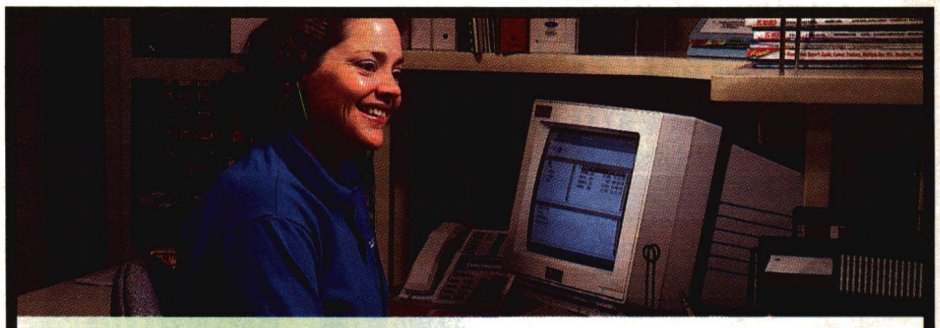

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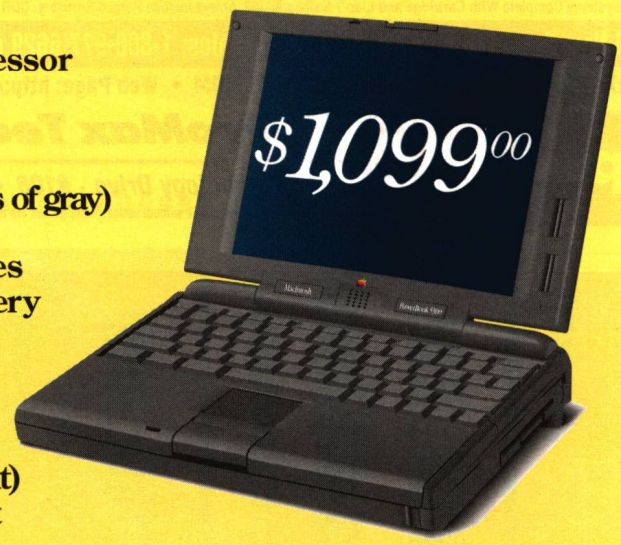

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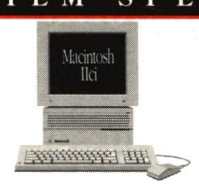

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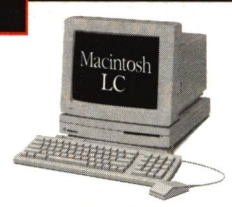

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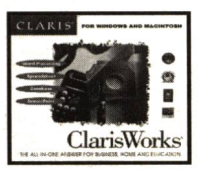

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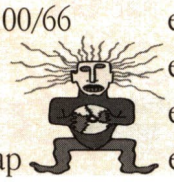

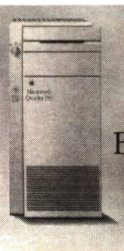

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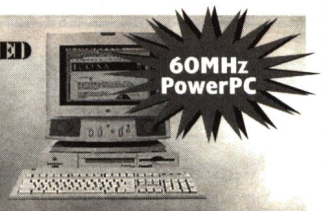

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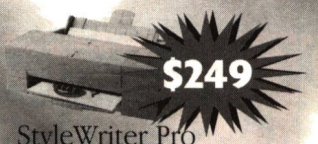

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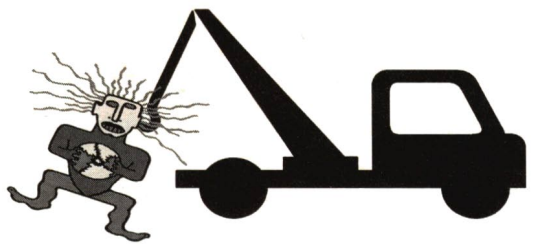

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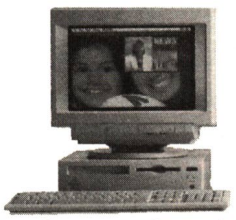

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- System 7.5
- ClarisWorks 3.0

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- maximum RAM: 40MB

PRE-LOADED SOFTWARE:

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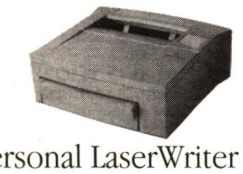

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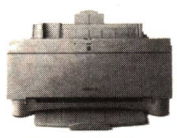

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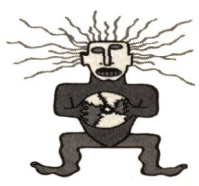

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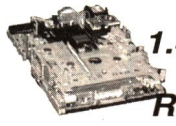

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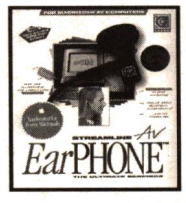

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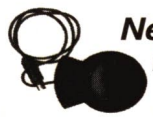

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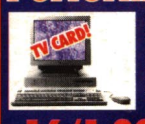

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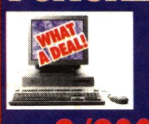

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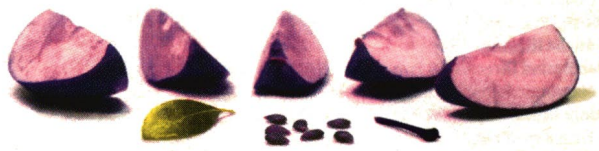

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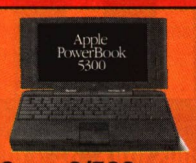

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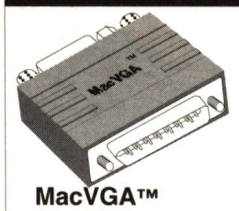

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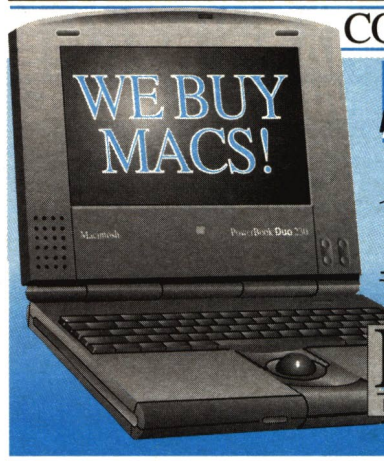

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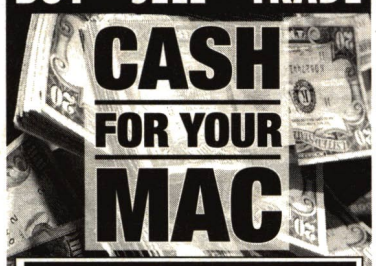

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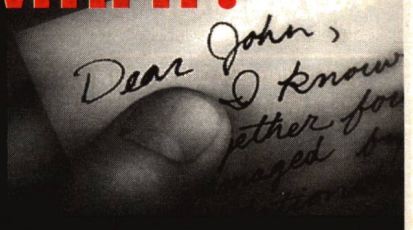

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Big sites

From Page 1

tel. Brian Murphy, a company spokesman, said, "To my knowledge we have not yet stopped purchasing Macs."

Hassan Dayem, director of the computing, information and communications division of Los Alamos (N.M.) National Laboratory, said his organization has launched a three-month study to determine the Mac's fate there.

Dayem, who manages a $175 million budget covering Mac OS, Windows and Unix systems, cited numerous reasons for conducting the study. "You have to ask yourself: 'Can we effectively support three platforms?'" he said. "Then there's the commercial release of Mac software: It's always after Windows, and it generally is not as good. How long am I willing to accept this lag?"

Following the commercial market is becoming increasingly important at Los Alamos, Dayem said. "We have to leverage what's going on in the industry." He also pointed to Apple's market-share problems. "The best technical solution does not always win in the marketplace," Dayem said.

At Sprint Spectrum LP of Kansas City, Mo., incoming Chief Information Officer Greg Tolander told managers last month that they had to submit business justifications to keep their Macs. Otherwise, Tolander said, Windows 95 systems will be put on their desktops.

An experienced Windows 95 user at Sprint said, "Hell, Win 95 doesn't have what the Mac has. And when it does, it isn't as good."

Sources at Sprint said IS staff members are calling people within the company and asking them to turn in their Macs now.

These recent moves against the Mac at large sites put significant pressure on Apple to defend its position in the corporate market. Apple Americas President Jim Buckley and his staff have been visiting corporate customers over the past five weeks as part of his organization's Operation Reboot program.

"It's a critical issue to us, no denying it," Buckley said.

Steven Angelo, Apple vice president of enterprise sales and marketing, said, "There are some myths we have to overcome, particularly in terms of software availability and development tools."

Angelo said Apple has had problems communicating with corporate sites. "I don't think we've done an adequate job in the last two or three years explaining how serious we are about the enterprise market," he said.

Some sites, however, continue to invest in the Mac platform. Steve Wheeler of Lockheed Martin Missiles & Space Inc. of Sunnyvale, Calif., said, "There's been no significant pressure to standardize on one platform."

According to Wheeler, Lockheed just completed its 1996 evaluation on how to "refresh the desktop." He said the company has decided to continue buying computers at the same ratio it has for the past five years: 70 percent Mac and the rest Windows. This year that will translate into about 2,100 new Macs at the site.

At the Jet Propulsion Laboratory's Technology Measurement Center in Pasadena, Calif., Edmund Baroth, technical manager, said: "We're buying Macs. We have absolutely no plans to settle on one platform."

Los Alamos' Dayem said the dramatic advances on the Web could change the entire platform equation. He said as Los Alamos moves to put more of its information on-line, he's looking for a solution that is secure and can handle transaction processing. He doesn't care which operating system leads the way, Dayem said.

Angelo acknowledged the Internet's importance but added: "If an IS manager has big investments on the desktop, now is the worst time for a transition. What you have on the desktop now will become virtually irrelevant. What will be relevant is the way you connect to the Internet and intranet." □

Loss

From Page 1

cepted the news as a positive sign. Apple's stock jumped 1.38 to close at $25.38 after the announcement Wednesday.

Daniel Kunstler, senior technology analyst for J. P. Morgan Securities Inc. of San Francisco, said: "It's very good news that we're seeing decisive action. They're writing down what they should for reengineering the business."

The unsold inventory may prove to be an unusual strategic asset. "Amelio intends to move excess inventory into markets that would not normally buy Macs. If it works, it will be brilliant," said Pieter Hartsook, publisher of The Hartsook Letter in Alameda, Calif.

Amelio is said to be exploring the idea of virtually giving away some of Apple's estimated $2 billion worth of inventory to international markets or to U.S. education areas that otherwise would have purchased Intel-standard PCs.

"If he's got old inventory and he can give it away to gain mind share, that's great," said Lise Buyer, vice president of T. Rowe Price Associates of Baltimore.

Despite Amelio's stated belief that turning companies around does not automatically lead to layoffs, sources said future restructuring could cost up to 2,000 jobs in addition to the 1,300 positions eliminated by Apple at the start of the year.

Analysts said that if the projected shortfall in revenues this quarter persists into the future, reducing head count will be inevitable.

When asked about additional layoffs, George Scalise, Apple chief administrative officer, said, "We're not commenting at this stage."

Overall, analysts liked what they heard from Apple last week, but they said the news of the big loss was only the beginning of a tough year. "This announcement is like one of those self-help programs," said T. Rowe Price's Buyer. "They have to admit there's a problem. It doesn't mean they're cured."

"This should be the first of Amelio's three-step program," according to Michael Murphy, editor of California Technology Stock Letter in Half Moon Bay, Calif.

He said the initial move to deal with the bloated inventory is being taken. Next Apple will have to get manufacturing costs in line with those for Intel-standard computers. Finally, Murphy said, the company has to "develop an alternative vision of where the industry is going."

"Apple needs a compelling application or product to get users and developers back to the platform," he said.

In his statement, Amelio said, "The inventory write-downs and restructuring charges are the first critical steps in orchestrating the comeback of the company."

Apple will "articulate plans by early May" on how it intends to become competitive again and return to profitability, he said.

According to Hartsook: "Although Apple has said there was going to be huge loss, the company does not seem to be in disarray. It's not being seen as the end of the world at Apple." □

Eudora

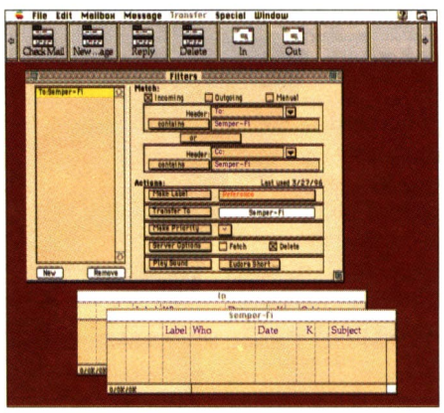
From Page 1

to the desktop. Users will also be able to attach files by dragging them onto a message. Sources said Eudora Pro 3 will let users drag URLs, or uniform resource locators, from messages onto a Web browser window or Command-click on the URL to launch a browser.

The message-filtering window will give users more automatic move, mark and reply options, sources said. As with the current release, two factors can be used to identify messages to be affected, but Version 3.0 users will be able to do more to a message once it is matched.

For example, users will reportedly be able to change a message's status, priority, label and subject; instruct the program to notify users with either a dialog box or sound; open or print the message; and redirect, forward or reply to it. Users will also be able to download the file if it is larger than the accepted maximum size, delete it from the server, copy it to a folder or transfer it to another mailbox. Sources said users will be able to apply up to five actions to each message.

Eudora Pro 3.0 is expected to let users create and read messages with styled and colored text. Mail will incorporate multiple fonts and font sizes as well as paragraph alignment and indentations. Sources said the formatting will be readable by other Internet clients that support styled text.



Eudora's enhanced filtering will do more to sort (or eliminate) incoming and outgoing messages.

An enhanced Find feature will let users specify which mailboxes and folders to search and will provide VCR-style controls for skipping over messages or entire mailboxes and for searching backward.

Other notable features include a customizable tool bar that can be resized, the capability to save messages as stationery, easier integration of encryption software and the capability to store more than two signatures.

"This new version will give [Claris Corp.'s] Emailer a serious run for its money," said an anonymous beta tester.

Qualcomm of San Diego was unavailable for comment. □

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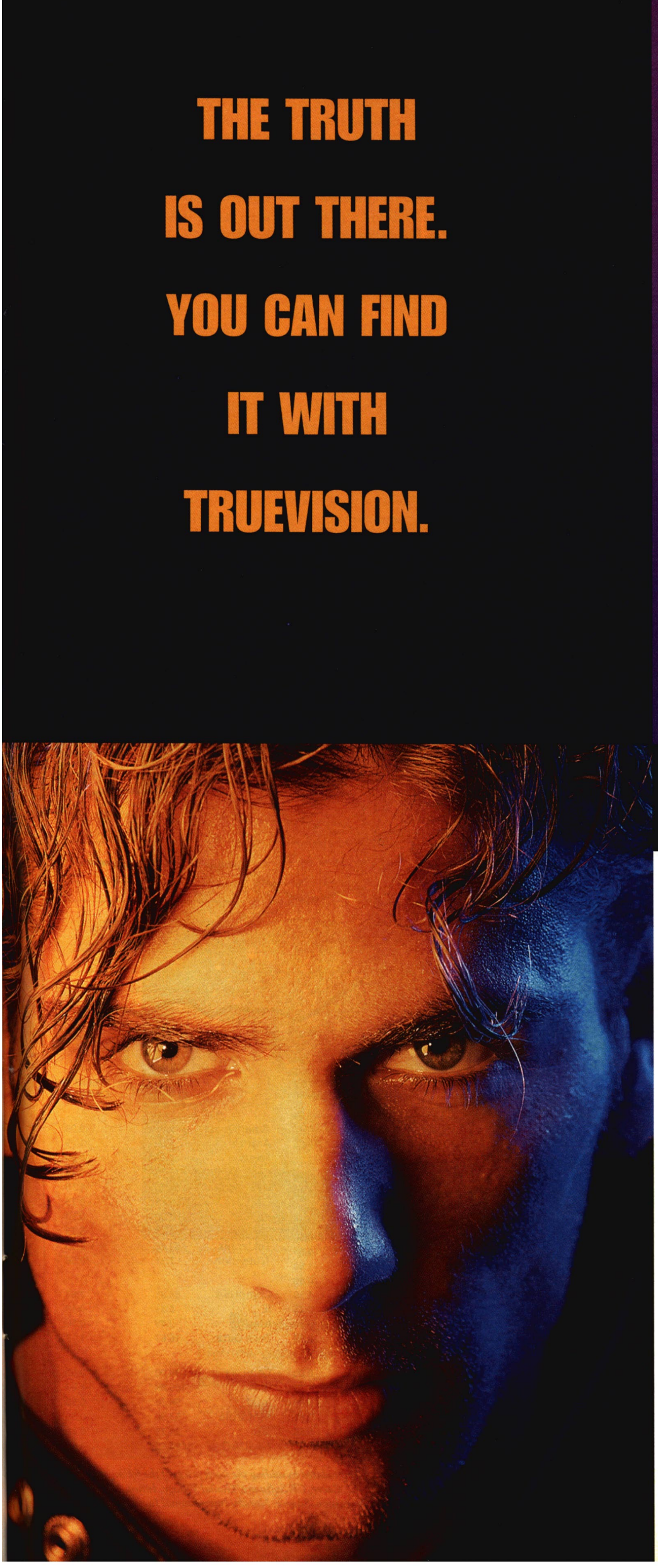

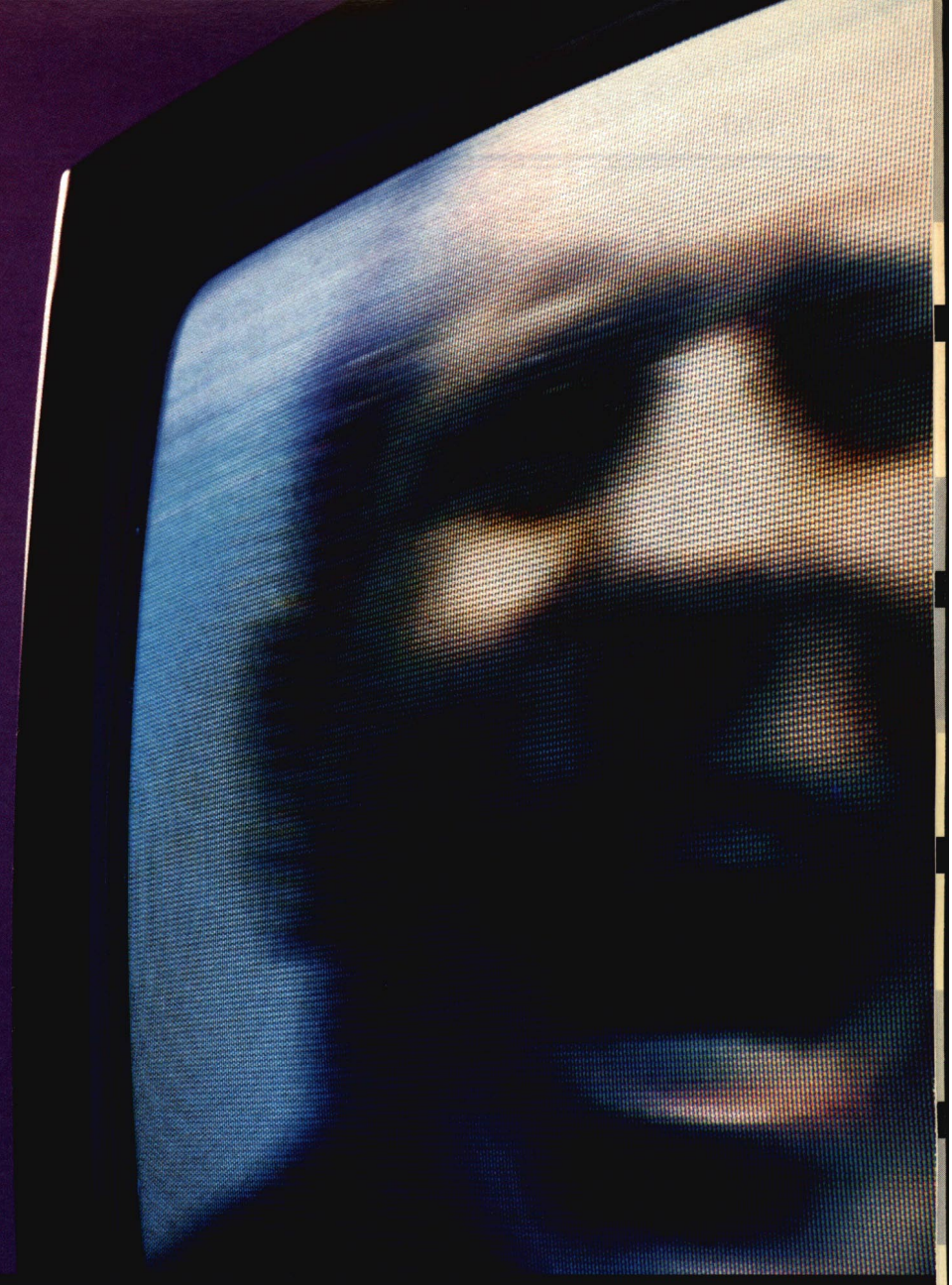

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Entry level

From Page 1

velopers' needs, sources said. She said developers will gain easier access to Apple resources.

Larry Tesler, newly appointed vice president for Internet platforms, reportedly said Apple would be drawing its disparate Internet technologies into a cogent strategy. Apple will also bundle its Internet Connection Kit on all Macs, sources said.

"They are really talking the talk about developer support," said one attendee. "They are recognizing how important third-party developers are to their business."

Another vendor agreed: "Apple really wants to get the involvement and support of key developers. This is a radical departure for them."

Attempting to nix reports that it will focus future efforts on high-end machines, Apple also previewed several new entry-level CPUs. Sources said the midyear Performa plans reportedly include a new tower design (see 01.08.96, Page 1) and the introduction of the first PCI Performa models.

According to sources, the first in a series of new entry-level releases will be the LC 5400, an all-in-one PCI system. Code-named Chimera, the 5400 will reportedly use a 100- or 120-MHz PowerPC 603e (see 12.04.95, Page 1) and ship this month in the education market. Its modular cousin, the Performa 6400, code-named Elixir, will make its first appearance this summer.

Apple this summer will also release its first tower system aimed at the home market, the Performa 8300. Sources said the system, code-named Instatower, will have ports at the top of the box instead of the back.

The new systems will also see the debut of a new naming system for home market machines.

Apple will stop its practice of having a different model number for every Performa configuration. Instead, the company will name machines for their targeted market, sources said. For example, Apple will release the Performa 8300 Multimedia System, an 8300 Business System and an 8300 Home System.

In addition to its preview of entry-level hardware, Apple reportedly gave its developers a peek at ClarisWorks running embedded OpenDoc parts. "To me, this was the first implementation of OpenDoc that makes sense and works," a developer said.

Content and game developers were pleased that Apple will provide system-level support for Digital Video Disc, the next generation of CD-ROM technology. Apple reportedly showed the Copland search engine, code-named V-Twin, searching a DVD.

According to attendees, Apple said it is looking at the Universal Serial Bus standard for input devices but will continue to support ADB as well.

"I went into that meeting concerned about where Apple was going but left with a big smile on my face," said one developer. "I felt my stock was in good hands."

Apple declined to comment. □

Apple's new springboards for low end

NAME	PROCESSOR	CASE	DUE DATE
LC 5400*	120-MHz 603e	All-in-one	April
Performa 6400	120-MHz 603e	Modular	June
Performa 8300	120-MHz 603e	Tower	June

**A Performa version of this machine may debut this summer.*

200 MHz

From Page 1

Sources said Power is able to deliver systems with faster processors more quickly than Apple because of its lower volumes. This was the case with the 150-MHz PowerPC 604, which both Power and DayStar Digital Inc. use in current systems; Apple is expected to announce its first machine with that CPU this month.

These vendors' plans are in line with those from IBM and Motorola. Jim Smith, a spokesman at IBM's Fishkill, N.Y.-based Microelectronics Division, said, "The plan is to have a PowerPC 603, 604 or both at at least 200 MHz or better this year."

Will Swearingen, manager of product marketing at Motorola's Austin, Texas-based RISC Microprocessor Division, said that while 166-MHz models are next on the agenda for 603e development, "within 1996 it's reasonable that you'll see 200-MHz speeds."

Contrary to earlier reports, Motorola and IBM will not ship a PowerPC 603ev; Motorola said that was an internal code name for faster versions of the 603e.

Motorola said the 603 compares most directly to Intel Corp.'s Pentium, while the 604 is most similar to the Pentium Pro. Recent reports said Intel is working on Pentium Pro speeds up to 266 MHz.

In addition to Apple's reported plans, Mac clone vendors are expected to jump on the 200-MHz bandwagon quickly. While declining to comment on specific company plans, Power Computing Product Marketing Director Bill Goins said, "150-, 166- and 200-MHz speeds [are] the right thing to do for our industry."

Peter Mehring, general manager of UMAX Computer Corp. of Santa Clara, Calif., said UMAX is designing machines that will run well into the 200-MHz range. "Our goal is to support [new CPU] products when they become available," said Mehring, who declined to comment on specific models.

Jim Turley, senior editor at the Sebastopol, Calif.-based Microprocessor Report, said that IBM and Motorola should be able to push PowerPC speeds because of new fabrication lines. "200 [MHz] is not outrageous, and I would certainly expect Apple and others to jump right on that," Turley said.

"There's no particular barrier at 200 MHz, and I would expect the clock speeds to ramp up pretty much continually."

In other PowerPC news, 1997 will also see the first processors from San Jose, Calif.-based Exponential Technology Inc., a recent PowerPC licensee (see 12.11.95, Page 1). Exponential said that by using a BiCMOS processing technology, its processors, due in the first half of next year, will be the fastest available.

Rick Bergman, vice president of marketing, said Exponential was not concerned about a 200-MHz 604e. "We don't see any CMOS solution that will compete with us in 1997 — from anybody," Bergman said. □

Taxing times for Mac accounting software

By Clifford Colby and James Staten

Doing accounting on a Mac may soon become a lot tougher. Three developers have begun letting the air out of their offerings for the platform.

Intuit Inc. of Menlo Park, Calif., said last week that it is considering ending development of ProSeries for the Macintosh, a professional version of MacInTax. The Mac version of Great Plains Accounting from Great Plains Software Inc. of Fargo, N.D., is approaching the end of its life cycle. And State of the Art Inc. of Irvine, Calif., is looking for a buyer for Mac P&L, its low-end accounting package.

Bob Meighan, Intuit group product manager for professional tax products, said the company has been surveying its ProSeries Mac customers to see if they would be willing to switch to Windows. Preliminary results show most users would be willing to move, though grudgingly, he said.

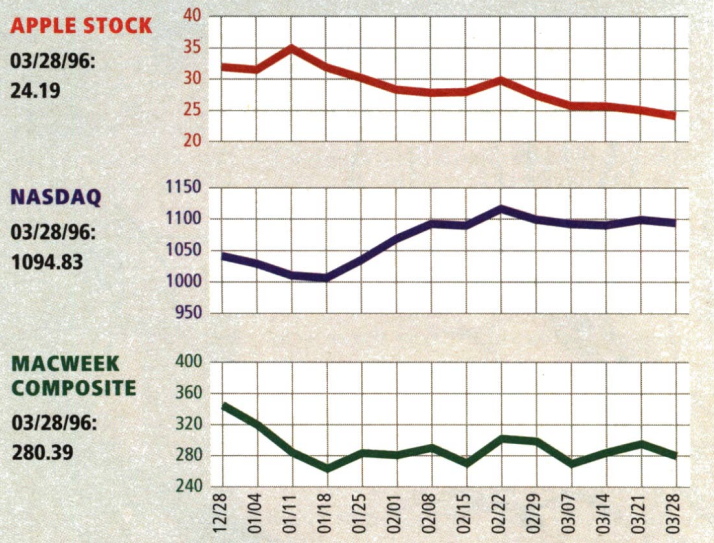
"Our Mac base of customers is only about 2 percent — about 800 customers," Meighan said.

Contrary to earlier reports, Intuit said its action with the ProSeries line will have no effect on the MacInTax or Quicken for Mac product lines.

According to Cecil Bordages, Great Plains product manager for middle-market products, the company announced nearly a year ago that it would stop development of Great Plains Accounting for the Mac. The company will migrate its customers to Dynamics, a higher-end package with Mac clients and Windows NT or Novell NetWare servers. Bordages said that while development continues on Accounting, shipments are expected to stop in May. However, Bordages added that the company may extend the life of Accounting in response to a grassroots movement by customers.

State of the Art Marketing Vice President Daniel Shapero said development has been halted on Mac P&L; the company is seeking a buyer for the product. State of the Art said it is continuing to support the product for its 13,000 customers. □

StockWatch



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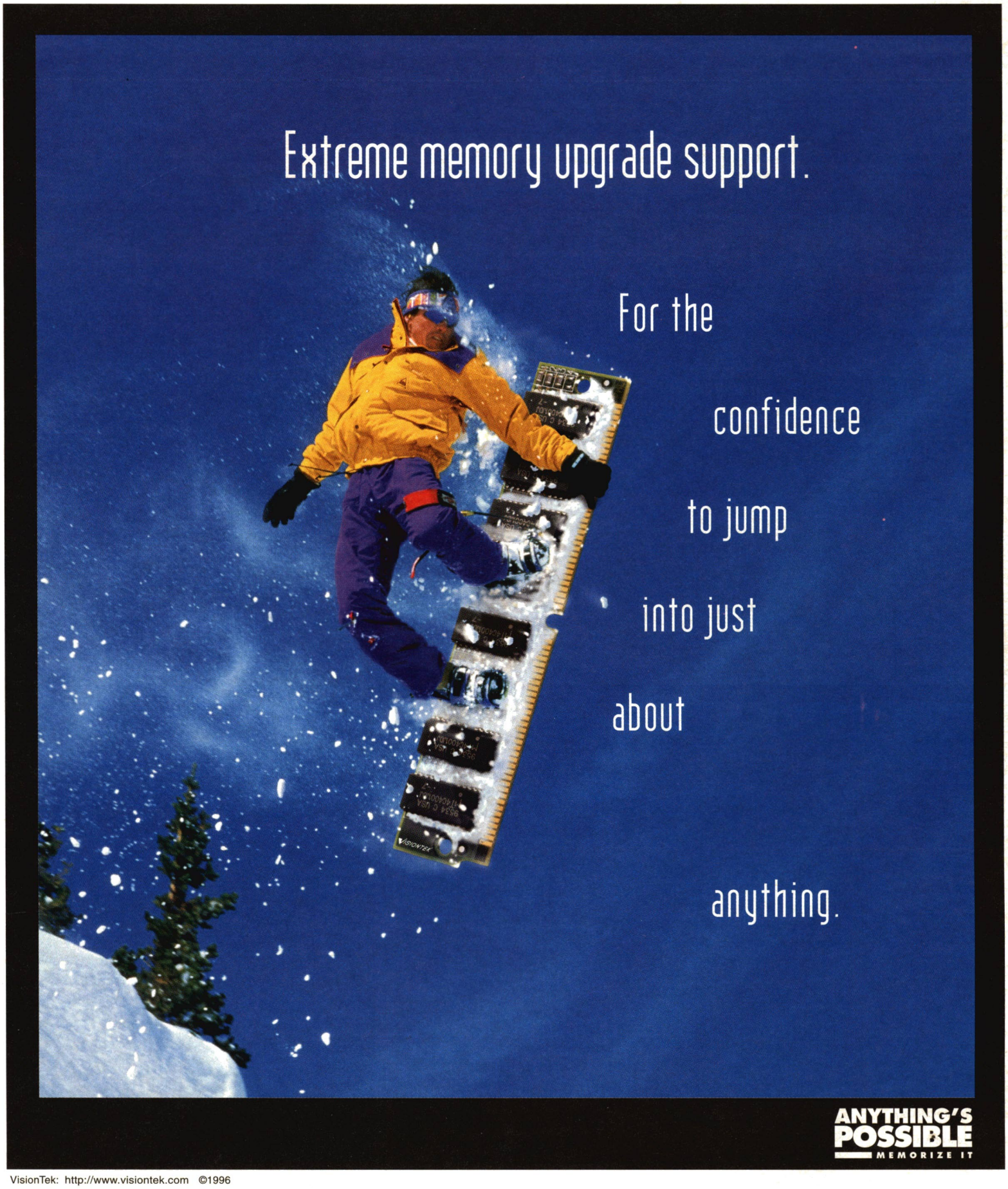
Apple	24.19	-0.94
MacWEEK Composite*	280.39	-15.55
SOFTWARE DEVELOPERS		
Adobe	31.88	-2.38
Caere	8.00	-0.63
CE Software	2.50	-0.25
Fractal	12.25	-1.00
Graphsoft	6.38	-0.50
Insignia	6.13	-0.81
Intuit	45.50	-1.50
Macromedia	43.38	-0.50
Microsoft	102.25	1.50
Novell	13.25	0.25
Oracle	48.13	-0.50
Symantec	12.75	-0.38
STORAGE		
Conner	25.75	0.00
Iomega	25.81	1.81
Pinnacle	7.94	0.06
Quantum	18.44	-0.81
Seagate	53.63	-0.38
SyQuest	5.13	-1.25

	03.28.96 CLOSE	WEEKLY CHANGE
PERIPHERALS VENDORS		
AmeriQuest	0.88	0.06
Asanté	6.00	-1.25
Focus	2.69	-0.69
Global Village	15.75	-1.19
HP	93.25	-1.50
QMS	4.63	-0.75
Radius	2.00	-0.50
Shiva	88.75	-5.75
Tektronix	33.88	-0.50
Truevision	7.31	0.56
DISTRIBUTORS		
CompUSA	53.25	3.63
IE	5.31	-0.19
Merisel	2.49	-0.50
Tech Data	16.63	1.13
INDUSTRY INDICATORS		
Compaq	38.00	0.00
IBM	109.88	-4.88
Intel	56.38	0.50
Motorola	53.50	-0.88
SGI	24.75	-0.25
NASDAQ	1094.83	-4.96

**The MacWEEK Composite is calculated by adding the stock prices of the following companies: Apple, Adobe, Asanté, Caere, CE Software, Global Village, Intuit, Macromedia, Radius, Shiva, SyQuest and Truevision. Source: Nordby International Inc.*



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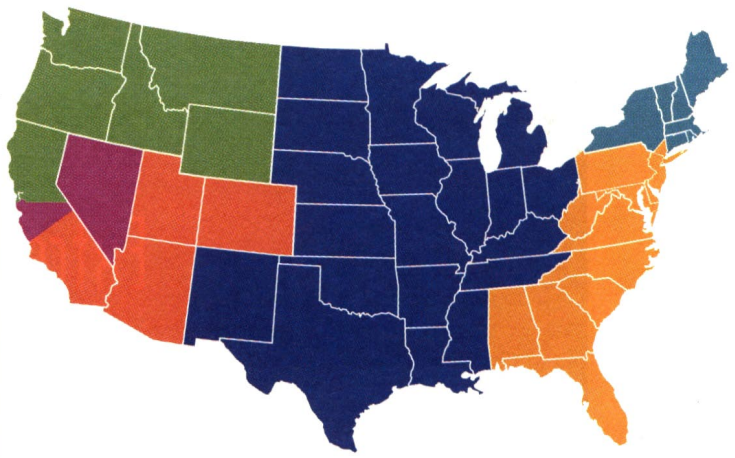

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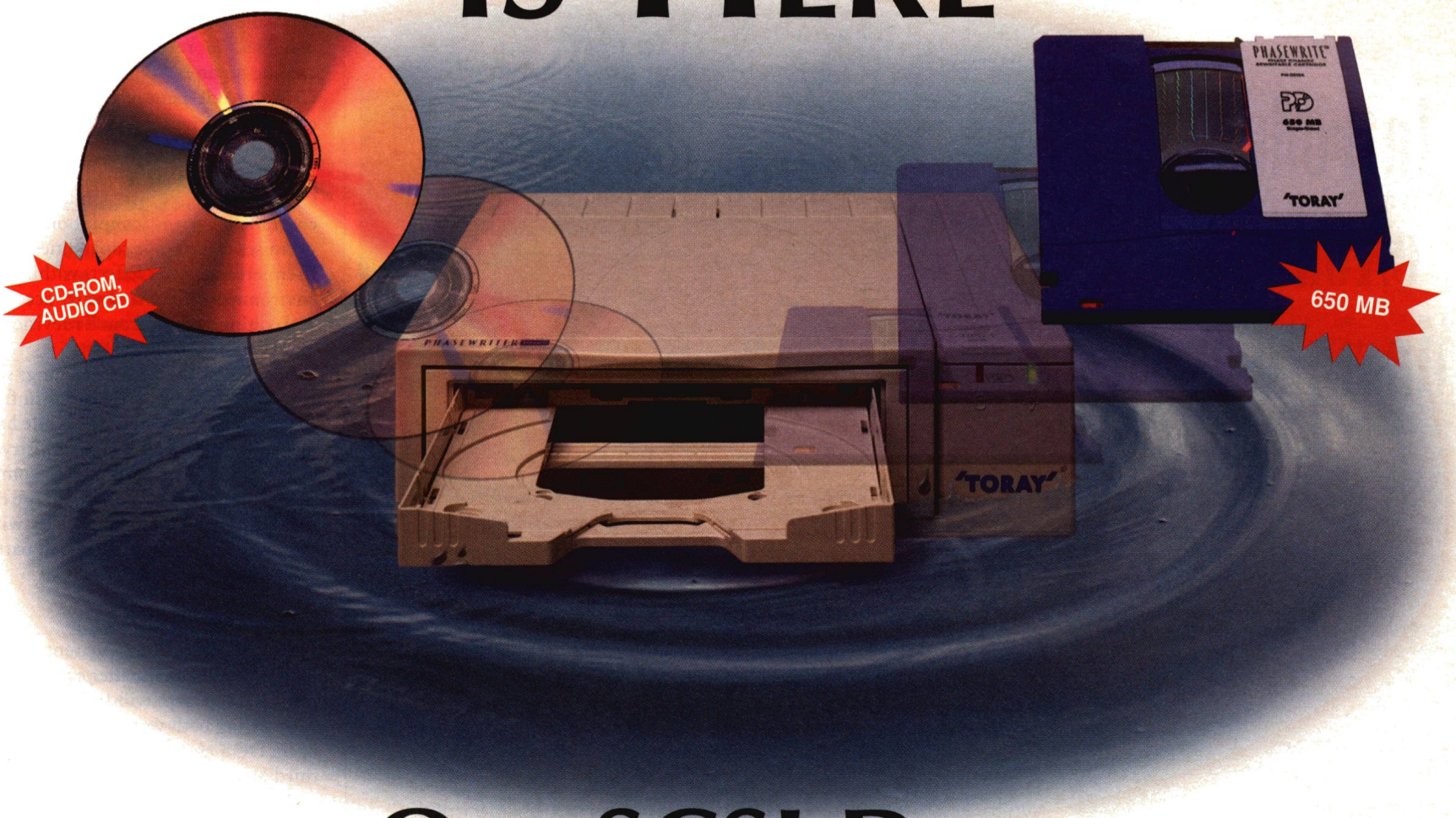

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Welcome back, Apple

What were *you* doing in April 1976? As he muses on Apple's china anniversary, which catapults the company from awkward adolescence to midlife crisis in a single bound, the Knife is soothed by reveries of his own wasted youth during the Me Decade. While Gil & Co. seem eager to shelve Apple's polyester past faster than you can say "Dy-no-MITE!" the Knife is donning his bell-bottoms and KISS Army patches in the spirit of the season.

Consider the avatars of '70s culture, the folks who — for better or worse — made the Knife and his contemporaries what they are today: Hamilton Jordan. Evel Knievel. Fantasy Island's Tattoo and Mr. Roarke. Peter Frampton. Steves Jobs and Wozniak embodied the best and brightest qualities of all these notables as they stepped fearlessly from the under-the-counter pharmaceuticals trade into the bright sunshine of high tech.

Message to Gil Amelio: Why not *embrace* those days of wine and roses? In light of Apple's projected bajillion-dollar loss, it couldn't hurt to turn the company into the first retro-cyber outfit of the Digital Age. Like lava lamps, troll dolls and Bob Dole before it, Apple is due for a renaissance. Bring back the Lisa, Dr. Amelio, and all will be forgiven.

Video killed the radio star

But enough of these pipe dreams; let the tips begin. After twisting thumbs all over Silicon Valley's multimedia mines, the Knife is delighted to reveal that Macromedia is angling for an NAB announcement of Key Grip, the code name of a video-editing suite created by former Adobe Premiere majordomo Randy Ubillos.

Sources great and small agree that Key Grip should give Mr. Ubillos' erstwhile comrades-in-arms conniptions, since it promises to envelope capabilities that rival Premiere and After Effects within an open environment for hardware accelerators and editing systems from Truevision, Data Translation and Avid.

Spending a few chilly mornings sipping Ripple with the local denizens in front of the Macromedia offices, the Knife has gotten a gander at a parade of industry notables making the pilgrimage to commune with Randy's kids. Word from the curb is that Key Grip will tie in directly with the Digital Video format, thanks in part to its support for FireWire ÜberSCSI.

I am the passenger

Back to the '70s: In an apparent homage to David Bowie and his alter ego Ziggy Stardust, Reply Corp. will let owners of PCI Macs swing both ways with a new version of its DOS compatibility card due in the third quarter.

The Knife's cadre of glam rockers reports that the new coprocessor board will support DIMMs, so users can swap memory between the Mac motherboard and its Reply doppelgänger. Reply will start dealing the card with a 100-MHz Pentium, but users with a thirst for raw power will be able to scale up to 200 MHz for even faster DOS gratification.

Do that to me one more time

And speaking of grizzled rock 'n' roll animals: Despite being declared *non compos mentis* by some industry naysayers, QuicKeys is showing some signs of life. The hoary macro utility is due for a shot in the arm when CE Software ships Version 3.5. According to the Command-key contingent, the upgrade will include a revised, tab-oriented interface in the main and the sequence editor views. The revamped utility will feature tool bars and floating palettes for easy access to keyboard shortcuts (countering WestCode's upstart OneClick product) as well as a new Batch Processor extension for automatically using a QuicKeys sequence on a set of files in a folder. □

Get down with your bad self and garner a MacWEEK mug in the process! Tip the Knife at (415) 243-3544; fax (415) 243-3651; mac_the_knife@macweek.com.

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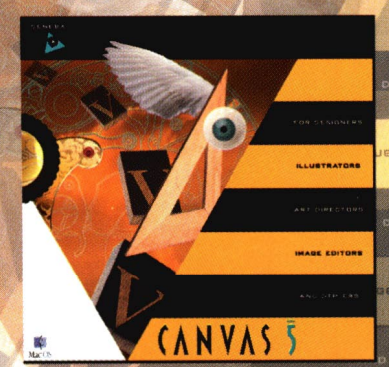

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